

FIRST LOOK: KYOSHO BIG BOSS!

December 1989

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Radio Control CAR ACTION

THE WORLD'S PREMIER R/C CAR MAGAZINE

USA \$2.95



NITRO NATIONALS!

J A M O N T H I S !



PROJECT PUMPKIN

OFF-ROAD NATS

Build A Trailer

HOW TO: WINNING CONCOURS





CONTENTS

Volume 4, Number 12

December 1989

FEATURES

16
PROJECT PUMPKIN
by Jim Shepka

24
PANDA STADIUM RACER
PREVIEW
by Rick Houle

29
KYOSHO BIG BOSS
PREVIEW
by Steve Pond

30
ON THE SCENE
by Wally David

36
1989 OFF-ROAD
NATIONALS
by Wally David

53
BUILDING IT RIGHT,
PART I
by Wally David

56
MK/PACESETTER R/C
NITRO NATIONALS
by Steve Pond

64
TRANSMITTER
TRANSFORMATION
by N. King

76
BUDGET RACER
by Dick Brinton

111
LOW-DOLLAR CUSTOM
TRAILER, PART I
by Jim Shepka

130
WINNING CONCOURS
by Rick Houle

168
CHEETAH RACING QC/DC
BATTERY SYSTEM
by Eric Goldschrafe

TRACK REPORTS

48
ARISTO-CRAFT WILDEBEEST
by Fred Murphy

72
FINE DESIGN
STREAMLINER RAIL
by Bill O'Brien

120
TAMIYA FIRE DRAGON
by Bob Gagne

DEPARTMENTS

6
EDITORIAL
by Chris Chianelli

8
LETTERS

12
READERS' RIDES

20
INSIDE SCOOP
by Chris Chianelli

22
HOT TRACKS
by Barry Spinner

117
DIRT DIGEST
by Bill O'Brien & Bob Kane



170
WHAT'S NEW

210
AD INDEX



94
DELTA VILLAIN
by Joe Bruni

104
DWA BLU 2
by Mike Lee

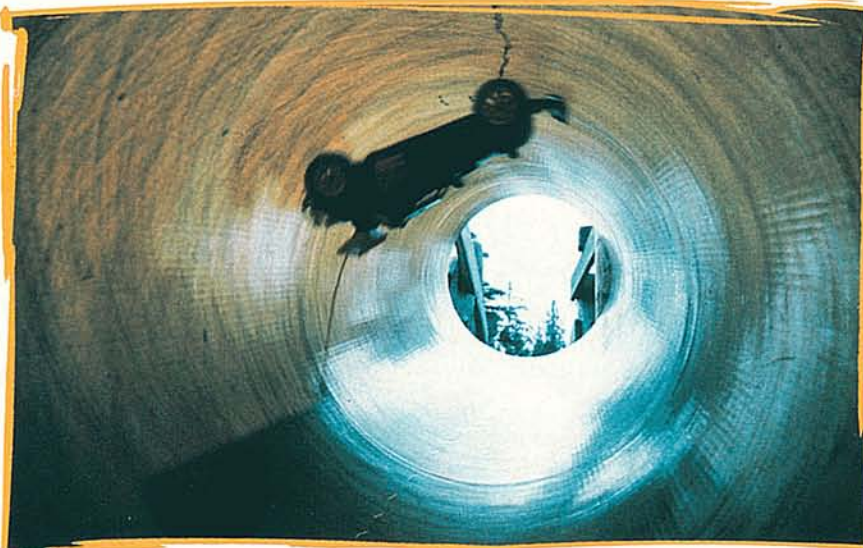
32
PIT TIPS
by Jim Newman

66
SCOPING OUT
by John Rist

ON THE COVER: Top: Pacesetter's Funny Car at Atco Raceway (photo by Steve Pond). Center: action strip (from left to right): DWA's 962 Porsche (photo by Mike Lee); Off-Road Nats (photo by Wally David); MK Engineering's 1/6-scale "Tin Man" Top Fueler (photo by Steve Pond); driving the "pipeline" (photo by Rob McLean). Below and top right: Off-Road Nationals action (photos by Wally David).

EDITORIAL

by CHRIS CHIANELLI



HAVE YOU EVER looked through a hobby catalogue and wished that anything you placed your finger on would appear right before you on the workbench? Well, I have. Unfortunately, Christmas comes only once a year, and the Midas touch is, at best, only as good as the number of relatives you're in good graces with. Of course, your relatives could be overly practical people who feel the need to upgrade your supply of thermal underwear! In this case, the free-goodies statistics get even worse. The holiday season does, however, bring that occasional unexpected prize. Here's one for you, Rob McLean, of Campbell River, BC: You get a free one-year subscription to *Car Action*. Hmmm... It really *does* feel good to give. Want proof? Give your old Hornet—you know, the one that's been collecting dust—to that kid who's been silently watching you eat up the track with your latest YZ-10 or JR-X2. Your action will make two people feel good.

OK; enough of the philanthropic trash. For the rest of you who are wondering why Rob McLean is getting "special treatment," he really isn't; he's the reader who supplied the special photo at the top of this page. We think it's very creative. If any of you think you can do better, just send your photo to me, and I'll present it to the Ayatollah of Radio Controlla. (Please make it *good*; he often kills the messenger!)

Oh, yes; I almost forgot! A gift also goes to 15-year-old Dave Williams of Brick, NJ. He's the winner of our Reader Survey drawing. Hope you can find a use for a Futaba Magnum radio, Dave, because it's on its way. Race in good health.

This month, we have a new column called "On The Scene," in which we give you an up-close look at some of the people who make up the R/C industry.

As I write, "hound dog" Houle is sniffing out the action at the biggest event in R/C off-road racing—the Worlds in Australia. Rick sent a telegram to say that the Humungous was spotted in the audience cheering the 4WD A-Main. He plans to attempt an interview with the ruler of the Wasteland. Good luck, Rick!

Without wanting to appear too sappy, I'll take this opportunity to thank all of you for being so much a part of *Car Action* with your letters, pictures and ideas. Be sure to keep it up in 1990!

Happy holidays!

CC

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LETTERS

WHERE TO WRITE TO US

If you're writing to the editors (and we'd love to hear from you), please be sure to address your letters to "Letters," *Radio Control Car Action*, 251 Danbury Road, Wilton, CT 06897. Only subscription orders and inquiries are handled by our Customer Service Department in Mount Morris, IL; other mail addressed there must be forwarded to Connecticut, which leads to long delays.

Eagle Eye of the Month

You have the best magazine in the world. I think I found the mistake for the Eagle Eye of the Month award. In the September '89 issue, on page 130 of the Eliminator article, it says "lap times are increased by more than 1 second." It should read decreased, not increased.

SHAUN ERWIN
Hoffman Estates, IL

Congratulations, Shaun. We're sending you your free Car Action decals. CC

Fox Fix

Your magazine is great, and I always try to get every issue. I'm 12 years old, and I've been into R/C cars for a little over a year. I own an MRC/Tamiya Fox with complete ball bearings, a Kyosho LeMans 360 Gold Motor and a KO Propo Ex-5 radio system, and I race my car quite frequently at our local off-road track. Since I'm just a kid, I must work hard for the hop-ups to my car, and I need to keep a competitive edge in my racing at all times. Now that I have enough money, I need your help in choosing between an electronic speed control and a Hot Trick racing kit. Which one would you recommend?

ROB PEGLER
Scottsdale, AZ

Rob, definitely go for the electronic speed controller. We'll soon be featuring an inexpensive aluminum chassis that's made from very rigid aircraft aluminum and manufactured by Sassy Chassis.

CC

Unfortunate Figures

I've been bitten by the gas R/C bug, and was very impressed with "Dirt Digest." It was so refreshing to read an article that didn't include the words "motor," "batteries," "speed control" and "RC10." The gas section of the R/C hobby has been very neglected and deserves more attention. I recently bought an issue of *Competition Plus* (I'm so ashamed), because it covered the McCoy race, and to my disbelief, it's the final one! The Ranch Pit

KYOSHO

A World Champion Ultima

For winning races, Ultima is the name to know. Whatever 2WD off-road crowd you race with, from beginners to pros, Kyosho has a 1/10 scale electric Ultima that is just right for you. Out of the box, the new **Ultima Pro** with graphite chassis puts serious racers in charge of the most advanced 2WD buggy available. If you're hungry for a taste of high-powered competition, the **Turbo Ultima** offers a long menu of the most important upgrades. The original World Champion **Ultima's** amazing record of wins is still unmatched — a perfect choice to begin your racing career!

The Kyosho Ultimas are Number 1 in 2WD off-road competition. There's a high-tech Ultima for every racing level, making your successful onslaught into the top ranks at your track simply a matter of good judgment. Choose your weapon carefully, and the winning will take care of itself.



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The Ultima claims top honors every time, including sweeping the 1987/88 IFMAR World Championships and taking Number 1 at many demanding national, regional, and local competitions. It's the perfect car for anyone ready to start racing — and winning.

- Most advanced suspension geometry available.
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- Accepts hop-ups for even greater performance.

Turbo Ultima™

For drivers who are ready to move up in performance and durability, Kyosho offers the Turbo Ultima. It has all of the Ultima's proven features, plus over \$350.00 worth of hop-ups — at a price you can afford.

- Full set of 14 ball bearings.
- Special, heavy duty 2mm chassis.
- Race-winning Kyosho ball differential, 4 Platinum Shocks, Heavy Duty Rotary Speed Control, and more!

Shop has also closed its 1/8-scale track. The article went on to say that lack of magazine coverage is one reason 1/8 scale is dying out and that "...only R/C News and ourselves would be able to cover 1/8 scale with any sense of class." Sounds like a put-down to me. You should show this typo-ridden magazine that you can handle gas as well or better than anyone else, and more articles such as the one by Bob Kane should be written. I'm sure I speak for many others when I say: Come on, *Car Action*, make those other magazines eat your exhaust!

ANDREW ZOLTAN
Teaneck, NJ

Unfortunately, Andrew, our present Reader Survey has revealed that less than 2 percent of our audience is into 1/8-scale

off-road, and only 1 percent is into 1/8-scale on-road. These figures seem to accurately reflect the overall interest in 1/8-scale fuel-powered vehicles throughout the industry. Obviously, our competition will use any opportunity to blame something, anything, on us. Their motivations are easily identifiable. Instead of blaming us, they should have been doing what we do, which is paying attention and responding to our readers' demands. It's unfortunate for people, such as yourself, that there isn't more demand for 1/8 scale. But we'll still bring you articles on 1/8-, 1/10- and the new 1/12-scale Cox fuel-powered cars, though probably not as frequently as you'd like. Don't worry, though. The info will be like the rest of our mag: high-quality. Thanks for your

words of confidence.

CC

Malaysian Madman

Superb mag! I'm a Malaysian R/C maniac who's suffering from the dreaded "monster truckatosis" disease. I want to replace my already sizzled stock speed controller. What's a suitable replacement for the affordable wind (under \$80 U.S.)? And about the 750SH "used to give out tons of ponies" motor: How about a replacement with lots of speed and torque? Wait a moment. Can I outfit a gas engine (with a clutch) to my Bruiser? Nitro Bruiser! Long live the Waste Land! Modify or die!

AMARJIT SINGH
Terengganu, Terengganu
Malaysia

(Continued on page 10)

Design for Every Driver



The Kyosho Ultima swept First, Second and Third Places at the 1987/1988 IFMAR World Championships.

NEW!
Ultima Pro™

Whichever Kyosho Ultima design you choose, you'll be in impressive company. Joel Johnson, Chris McElroy, Scott Montgomery, and hundreds of local racers everywhere have filled their trophy shelves by making an Ultima their choice. But there's still plenty of gold to be won. Drive the Ultima designed for your style of competition — and get yours!

For an inside look at the hottest Kyosho R/C models, send to the address below for your free copy of the Kyosho Mini Catalog from Great Planes.

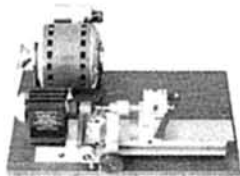
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LETTERS

(Continued from page 9)

Amarjit, you do have a severe case of tropical monster truckatosis. Forget the Nitro Bruiser, OK? Now, stick with the larger 750SH motor and try a Novak T-4 or a Tekin ESC 300. You didn't say if you wanted reverse. If you do, a Futaba MC 111 should do the trick. Thanks for writing; do it again if the mood strikes.

CC

Relic Found in the Philippines

Mabuhay from the Phils! I'm the number one fan of your rad magazine here in the Phils, and I just want to say that I think your mag is the greatest. It's the only one of its kind that educates and advises novice and pro R/Cers alike with in-depth reviews and unbiased comments. It's also the most graphically designed mag there is! My problem: I have a troublesome Tamiya Super Champ, a Blackfoot and an Avante, which your September '88 review by Mr. Ryan Fitz helped me select. Of these three cars, I had the most problems with my Super Champ. It's basically in stock configuration. My problem is with the front end, rear end, sides, etc. I was hoping you could help me out, because, despite all of its problems, I kinda love this car; it was my first R/C car, and it's fast! It weighs a little more than it should for a 2-wheeler, mainly because of the material used (90-percent die-cast?). Well, the main problem is the front and rear suspension and the differentials, which this car lacks. I've heard of RCH's modifications and Thorp's differentials for the Super Champ, but these are no longer available here. Please help me!

Last (I promise!), can I have an autographed picture of Crazy Chris, Smitty Steve, Joel Johnson and your publisher, Louis DeFrancesco, please?!

JEF BRAZIL LAO
Manila, Philippines

OK, Jef, I think I have the answer: Bronze the Super Champ, place it on the mantel-piece and run the Avante. You really want our autographs? You left out the Ayatollah of Radio Controlla; he's gonna be upset!

CC

Gearbox Problem

I have an RC10, and I have a problem with my gearbox: it isn't smooth. I've taken it apart, lubed it, run it—and it still isn't running smoothly. Is there any way I can fix my RC10?

JEFF STEPHENS
Washington, WV

Jeff, as stated in the article I did on the RC10 Torpedo, some work has to be done to the tranny so that it runs as smoothly as possible. Consult the article or see if you can get your hands on Jim Halsey's Tranny Tech Tips booklet; it should be available at your hobby shop. Either source should get you on the right track.

SP

Clod Clinic

I'm writing in reference to motor installation in the Clod. I have both the Trinity Clod Motors and the Speedworks Monster Mash 1 and 2. For both sets of these motors, the instructions specify the direction of rotation, but not the location (front or rear). The only information I've seen about location is in "Project Clod," which said that the reverse rotation motor bolts to the front. If this is done with all polarities being correct (according to the end-bell markings), the truck doesn't go in the proper direction. After some investigating, I've found that the reverse rotation motor must go in the rear to correct this. Thanks.

REY RASCO
Branford, CT

Rey, you caught me! Many apologies to all of you who followed my instructions on installing the motors in the Clod Buster in the Project Clod Buster article. In fact, the reverse rotation motor goes in the rear of the Clod, and the normal rotation motor should be in the front.

SP

Chassis Crisis

I've read a lot about the Clod Buster lately, and I'd like to get one. I'm a little concerned, because I heard there's a prob-

(Continued on page 14)

READERS' RIDES

Welcome to "Readers' Rides"! We continually receive photos of readers' latest projects, so we've decided to start featuring some of the more innovative stuff to give all our readers a glimpse of these neat cars and trucks, etc. So here we go! If you want to be part of this new feature, send us a nice color photo of your project with a brief description, and we'll show it to the Ayatollah of Radio Controlla at the next editorial meeting to see if he'll publish it!

If we publish your photo, we'll give you a one-year subscription to *Car Action*, or extend your existing one, and you'll even be eligible for our "Readers' Rides Car of the Year Contest" in the fall of '89. Send your photos to Readers' Rides, *R/C Car Action Magazine*, 251 Danbury Road, Wilton, CT 06897. Start clickin', shutter-bugs!

TAMIYA TOWING

Since Ray Zuranowski has two sons that race every week, dad found it necessary to build this Blackfoot tow truck. The front winch and towing boom were built from spare parts, picture-hanging wire and square plastic stock.



FUNNY TRUCK

Canada's Kelly Taylor's scratch-built '88 Chevy pickup uses a Pumpkin rear end narrowed to 2 1/2 inches with brass traction bars fitted to the diff case. Everything is bolted to a scratch-built rail-frame. The 2 1/4 x 1/4-inch aluminum aircraft front wheels are shod with 1/8-scale static model motorcycle tires. The outrageous blown 427 c.i. is from a 1/12-scale Monogram. Kelly added a few of his own touches, e.g., aluminum headers, mini auto fuel filters for air filters and an old makeup lid that "looks just like a Moon fuel cell." With a 13-turn Trinity drag motor fed by 10 cells, Kelly's Funny Truck ain't just for show.

e.g., aluminum headers, mini auto fuel filters for air filters and an old makeup lid that "looks just like a Moon fuel cell." With a 13-turn Trinity drag motor fed by 10 cells, Kelly's Funny Truck ain't just for show.

BODY BY LEGOS

Kirk Barnhart, from Lee's Summit, MO, gets the creative combo award for his Legos-clad Clod. Kirk says he spent hours building this Monster Legos Masher. The photo speaks for itself; very imaginative, Captain Kirk.



BLOWN LOW BOY

This 1/10-scale three-window coupe from the McAllister Gang with big block and blower was fitted to a 1/12-scale Fine Design Firefox dragster by Steve Lantz of Bakersfield, CA. Steve shortened the Firefox to create this super-looking 34-inch Low Boy, and he fashioned the drop front axle from 1/4-inch stainless-steel tubing with RC10 spindles on the ends. Once again, Advanced Engineering wheels and tires do justice to a cool car.

PROJECT WILDERNESS

Steve Pond's "Project Blackfoot" inspired Ramblin' Ron Chase from Englewood, CO, to build this Miller/Blackfoot. He was so inspired, in fact, that the list of mods, from working lights to aluminum steering block, is way too long to list. Ron asked us to pass on a photo to Steve. We did, and Steve responded, "Very nice."



GUAMANIAN SUBMARINE RACE

Here's Joseph Fejeran's Parma Ford Delivery Wagon on an MRP GP10. This beautiful hot-rod sports Advanced Engineering aluminum wheels, working headlights, chrome trim done with aluminum tape and non-skid running boards. The photo was taken from Fort Apugan, Guam, overlooking Agana Bay; yet another sight of the famous submarine races.



IT'S ALIVE!!

Jonathan Tarrant of Mississauga, Ontario, Canada, claims responsibility for this Lamborghini monster thing. Jonathan, what were you thinking of when you had this vision? I think part of the answer is in the vehicle's name, Frankenstein II. Appropriately, Jonathan's Countach Crusher is made from "many different bits and pieces."

A Hornet gearbox serves as the center floating-axle drive, while the front and rear wheels supply 4WS. The creature crawls on six Monster Beetle rims with Blackfoot tires. Everything is tied together by a scratch-built chassis formed from aluminum and brass tubing. If you're ever in Mississauga and you happen to see a castle with lightning and metal kites hovering around it, accompanied by the stink of Banana Lube that can be detected half a mile away, say hello to Igor—he likes four-door sprint cars.



LAND CRUISER COLUMBIA

Jim Castaneda of Lake Stevens, WA, writes: "Here's a brief description of my Toyota Land Cruiser for the Ayatollah of Radio Controlla." The chassis is a Blackfoot with a 600 E LeMans motor, and it has an Aristo-Craft SP-2040 R electronic speed control and Pro-Line

spiked tires. The body is from a "toy" Radio Shack one-wheel-drive car. We think that the first thing your creation saw after birth was the Space Shuttle Columbia, and mistook it for its mother; hence its proclivity for searching the sky for its mom.

ROCK BUSTER



The Original Rockbuster is a 1/10 scale electric off-road car which comes with a RS-380 motor. It has a 3 step forward/3 step reverse mechanical speed controller, rear differential, and soft rubber tires. It comes in kit and 95% pre-assembled form. 2 ch. radio and 7.2V hump pack required - not included.

Original Rockbuster

21331 - Kit • 21343 - 95% Assm.

The Hopped-Up Rockbuster is designed for competition. It has all the features of the Original, plus a heavy-duty rear suspension, adjustable oil-filled shocks, front torsion bar, RS540 motor, and new low-profile tires on gold colored rims.

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(Continued from page 10)

lem with a breaking chassis. I understand that it doesn't happen to all Clods, but I sure don't want it to happen to me! Is this problem avoidable? What about the ad on page 194 of your July issue? It claims to have a chassis-saver kit. Does it work? Please try to solve this mystery. Thanks for all your help, and keep up the great work!

STEVE FALLAS
Los Altos, CA

Steve, while it's true that there are some Clod Buster owners who have had problems with breaking their chassis, this isn't reason enough to go looking elsewhere for another truck. I've run my Clod on and off for almost two years without breaking a chassis. If you'd like a little extra insurance, though, try one of the reasonably priced Aerotrend, APM or ESP chassis reinforcing kits. SP

Unintentional

I'm a fairly new radio-control car enthusiast, and I enjoy your magazine tremendously. It has taught me a lot about the sport in a fairly short period of time. I was very disappointed with your January issue. Since I have an Optima, I was very interested in the corresponding article. The problem is, I can't find an article in the issue that deals with an "Optima Belt Conversion." If I'm misinformed about which article this is, please correct me. But if the article isn't in this issue, I would be very interested in an article pertaining to this subject.

MARK G. MOLZAHN
Appleton, WI

Mark, the article for converting the Optima/Javelin was in the January issue in the Project Javelin. Excuse us for not being very clear with the cover line. Among other performance tricks, the Project Javelin article describes in detail how to convert your Optima or Javelin into a belt drive. Sorry for the confusion. SP

Big Bear Body

I've had your September '88 issue for some time and finally got to read up on Project Big Bear, Part 2. A couple of questions: What company made the Bug body that went on the Big Bear? Does it necessarily have to go on a monster truck chassis? Any information will be appreciated. By the way, congratulations on the magazine!

RYAN VICK
Fayetteville, GA

Ryan, the body used in the Project Big Bear, Part II is made by BoLINK. While it's suited to the Big Bear, it will fit any other RIC chassis that has a similar wheelbase. Whatever chassis you decide to use this body on, you'll also have to buy new body mounts, which are available through BoLINK, as well as a number of other manufacturers. SP

Minor Mistake?

It has come to my attention that you've made a minor mistake. In your January '89 "What's New" section, you had a picture of what was supposedly an Ultima with an Allec & Lane trailing-arm conversion. Unfortunately, on page 44, you had a picture of the same car, only here it was identified as an RC10. What gives? Anyway, I just thought I'd let you know that you were getting just a bit careless. Otherwise, keep up the great work.

MATTHEW HORTON
Lexington, MA

Matt, hate to call you on this one, but you're wrong, wrong, wrong. The car pictured on page 44 of the January '89 issue is a shot of Chris Allec's car during the Car Action/Trinity Off-Road Shootout. This is, in fact, an RC10 using Allec & Lane's trailing arms, among other accessories. The car pictured in "What's New" is also using Allec & Lane's trailing arms, but this is an Ultima. The cars aren't one and the same, so wipe your glasses clean, dude!

SP

ROAR Weight Rules

Just how strictly are the ROAR weight rules being enforced? Last year, I had the privilege of racing against some pros, like Jim Dieter and Don Jones. While walking around to view other racer's cars, I stopped to look at both Jim and Don's. I was pleased to find that I had done the same things to my car as they had done to theirs. I then realized that my car only weighs 3 pounds. Since we both have very light Ultimas, and they have radio equipment lighter than mine, I figured that their cars were underweight. Am I wrong or are the pros being allowed to race with cars that are underweight?

CRAIG HAMPEL
Champaign, IL

Craig, gimme a break. These guys' cars have been on the scales more times than you've raced your car. While they're close to the limit, they could never get away with running underweight, even if they wanted to. Besides, there are too many other team drivers that want to make sure the cars they race against aren't under the limit. These top drivers have paid their dues at the track, putting time in to learn the "ins and outs" of how to make the cars really handle, which, in turn, makes them faster. Don't assume these guys are running underweight just because they're fast.

SP

Left or Right?

In your December '88 issue, you did an article on the Hyperdrive Conversion for the RC10 in which you showed how to change your standard spur-and-pinion gear to the Hyperdrive belt-drive system. How come you show a picture of the heat sink on the right and then a picture of the heat sink on the left side after the Hyperdrive conversion. Why do you go to the extra trouble to change the heat sink? Why don't you leave it where it is? You can take the old spur-and-pinion gear off on that side and put the Hyperdrive right on. (Look on pages 75 and 139 in the same

issue and you'll see what I mean.) Does it make a difference on which side you set up your Hyperdrive to work on an RC10? Thanks. Your magazine is great!

TODD ALLEN
Lincoln, NE

Todd, if read very carefully, the article explains why the Litesink is shown attached to different sides of the transmission in the two pictures. When using a pinion-and-spur gear, the pinion must rotate counterclockwise when looking at the gear side of the trans, in order to rotate the spur gear in a clockwise motion. In other words, the spur and pinion rotate in opposite directions. With the Hyperdrive, the addition of the belt causes the motor or pulley and the main pulley to rotate in the same direction. That means that if the motor pulley is rotating counterclockwise, the main pulley is as well. This will cause the car to go backward if the car is set up in the standard fashion. There are two ways to remedy the situation: One is to change the polarity of the wires going to the motor, but this could end up damaging your stock motors and would require re-timing the modifieds. The other way is to flip the motor plate, so you can change the direction of the motor rotation in relation to the trans, without having to touch the motor wiring. This allows you to use any motor, stock or modified, in your RC10. Keep your eye out for the new Hyperdrive RC10 Pro Kit, which drastically improves how the Hyperdrive works on the RC10.

SP

We welcome your comments and suggestions. Letters should be addressed to "Letters," Radio Control Car Action, 251 Danbury Road, Wilton, CT 06897. Letters may be edited for clarity and brevity. We regret that, due to the tremendous number of letters we receive, we cannot respond to every one.



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PROJECT PUMPKIN

by JIM SHEPKA

MY DICTIONARY DEFINES a midnight pumpkin as "a large yellow fruit of a vine related to the gourd that grows at 12 o'clock at night"—well, sort of! It's a safe bet that when the guys at *Car Action* asked me to turn a Pumpkin into an after-market project, they weren't just talking about adding a spoonful of "Miracle Grow."

In the May '88 issue, Steve Pond reviewed the MRC/Tamiya* Midnight Pumpkin, which is based on the highly successful Hornet/Pajero chassis. (Although it's not the kind of chassis that offers world-class performance, it more than holds its own in the marketplace.) Being the kind of guy who can't leave well enough alone, I headed off to see what little goodies were available for my Pumpkin.

The first part to come under scrutiny was the transmission

LIFE AFTER MIDNIGHT



area. Typically a weak spot in many plastic, planetary-gear-type transmissions, the added strain of a bigger motor and battery can over-stress even the best of these units. I began by tearing down the gear case and thoroughly ridding all components of lubricant, dirt, weeds, bugs and anything else that I found growing in there.

One of the biggest problems with this type of transmission is the tendency for the gears to "wobble" and "walk," because this leads to premature wear and a loss of performance. Since I wanted to eliminate as much



the axles must be enlarged to accept this design change. Simply use a 1/8-inch drill bit as outlined in the instructions. You might want to use a drill press for this step, but it can also be performed using a hand drill. When this is completed, you'll notice that the center pin

play from this area as possible, I turned to a bulletproof diff/shim kit from Miracle Speedway Racing Products* (MSRP). Its transmission kit includes a pair of bearings (these replace the standard nylon bushings), shim spacers and a larger center pin. Although the stock pin fits snugly into the center of the main gear, the ends are of a smaller diameter and, when installed, they cause the gear to wobble.

To eliminate this problem, the existing holes on the end of

now fits snugly into the ends of the axles.

Having reduced the "wobble," the next step is the elimination of the "walk" of the center gear on the spur gear. This is created by the lateral side play of the axles. First, replace the axle bushings with bearings at both ends, and join the halves of the gear case. Hold the case together firmly, and slide the axle in and out with your other hand. You should notice some side-to-side movement (play). Since the center gear is at-

(Continued on page 19)

PROJECT PUMPKIN

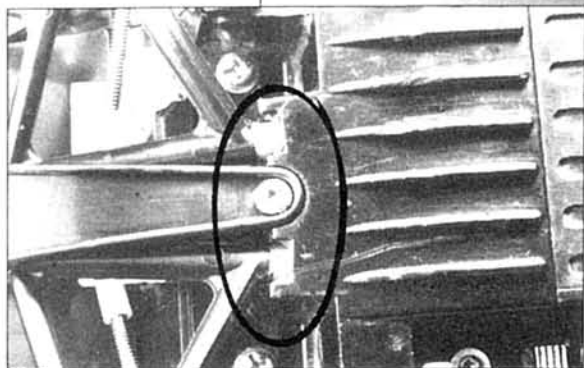
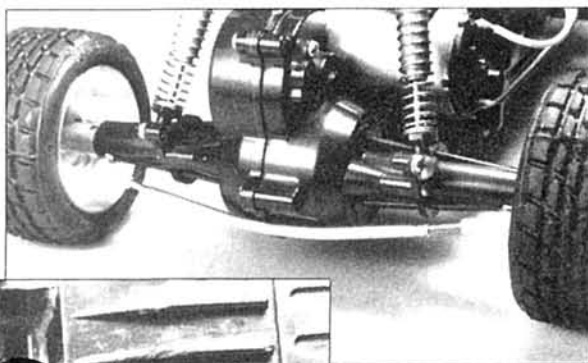
tached to the axles, this play causes the center to "walk" back and forth on the counter gear. You don't have to be a genius to figure out that this *isn't* the desired effect.

Open the gear case and put a spacer between the inside bearing and the end of the axle. At first, try one on each side, reassemble the gear case and test for play. Add or subtract as many spacers as you need to eliminate play but still allow the axles to spin freely without binding. You'll probably have to try this a few

caps onto the pre-bent support rod, adjust to the proper length, and snap into place. That's all there is to it.

Now that we have the transmission up to specs, to complete the conversion, we'll have to add an adjustable motor mount. CRP* makes such a mount, and it comes with good instructions, so I won't discuss them here. It's a lot easier to put it into place now rather than wait until the whole rear end is back together. (Later on, space gets a little too cramped for big hands.)

Right: The strengthening kit simply snaps into place after the ball ends are attached.



Left: To keep the front wheels headed in a straight line, these A-arm shims from MSRP and the heavy-duty tie rods are ideal for the Midnight Pumpkin.

times to get the right "feel."

Since the gear case is of the straight, or rigid-axle, variety, under heavy off-road use, tremendous strain is put on the wheel end. I've occasionally split the case in two by landing heavily to one side of the rear end. To beef up this area, I attached an MSRP gear-case strengthening kit to the bottom of the housing. Begin by drilling a hole in the gear case about 1/4 inch from the ends of the axle housing, and then attach the ball-end links to the housing. Next, turn the ball

Now that the running gear is in order, it's time to turn to the suspension. Since the tires are the only way to transfer the power to the ground, it's imperative that they stay planted there. The shocks that came with the kit wouldn't do the trick, so I opted for Tamiya's direct-replacement oil-filled units. The kit comes with various internal dampeners and various rod lengths and spring tensions. I chose to start with the two hole dampeners with the Blackfoot rods and springs. The

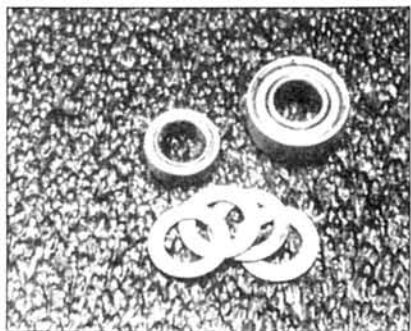
(Continued on page 84)



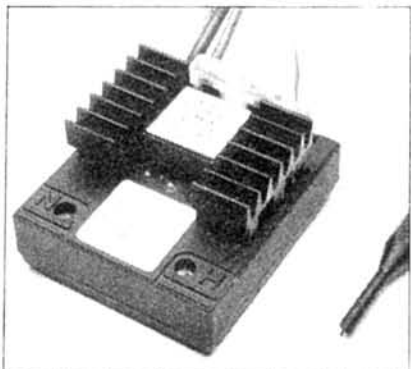
The MRC Top Gun pistol-grip radio was used for guidance.



The Twister powerplant provided plenty of wheel-spinning action.



Miracle Speedway bearings and diff shims provide smooth operation.



The Altech speed control performed without a hitch. Note the location of the unique built-in fuse.

INSIDE SCOOP

by CHRIS CHIANELLI

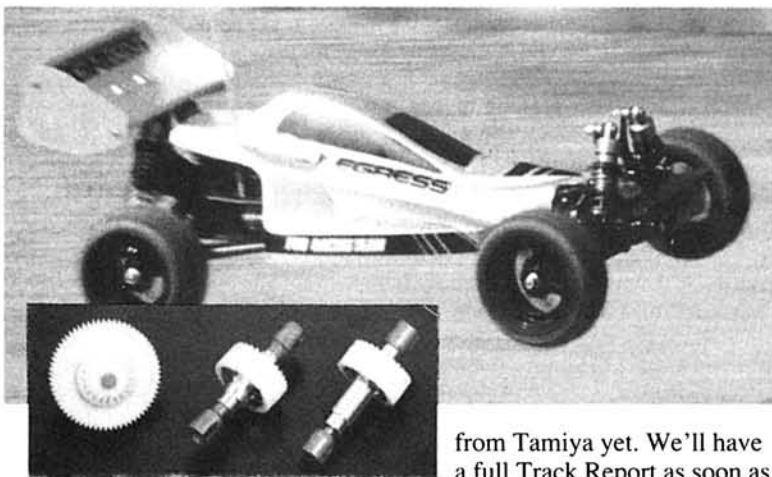
The R/C CAR industry is rapidly advancing, with new products being offered at a head-spinning rate. So, I'll make manufacturers nervous, but feed you R/C squirrels who are hungry for info, by bringing you a special report on security leaks and "late-in" items. Here goes!

NEWS FLASH!!

World Champion again! In Sydney, Australia, Masami Hirotsuka takes both the 2WD and the 4WD classes using a YZ-10 and the Associated 2WD prototype.

EYEBALLING THE EGRESS

Here's a look at the latest from MRC/Tamiya: the Egress. It appears to be a simplified—and lighter—Avante, or an upgraded Vanquish, and



it's a good bet that this is the most competitive version

from Tamiya yet. We'll have a full Track Report as soon as possible, and then we'll know for sure.

ELECTRIC DRAG ASSOCIATION

Owing to the lack of sufficient rules governing 1/10-scale drag racing on the part of ROAR or anyone else, the International Electric Drag Association (IEDA) has been formed. The IEDA's Street Stock Class, which is for production-type cars with gearboxes and plain bushing motors, is specifically for beginners. Pro Stock is for cars with modified chassis, eight cells and ball-bearing

motors, and it requires NAS-CAR or ASA full bodies that are five years old or newer. Pro Comp requires full-bodied cars, 12 cells and ball-bearing motors. The Funny Car Class is limited to 14 cells, and cars must resemble American production car bodies from 1980 or before. Alcohol Fuel Rails must resemble dragster-type cars and have 10 cells and a minimum wheelbase of 16 inches and a maximum of 25

inches. AA/Fueler Rails must resemble full-scale dragsters and have 20 cells; the wheelbase must be a minimum of 20 inches and a maximum of 30 inches. All classes have weight restrictions. I know many of you have been waiting for something like this, so here's the address: International Electric Drag Association, 2 North St., Middletown, NY 10940.

SCHUMACHER PRO CAT

Schumacher, which has long been known for its competitive cars in virtually all classes of R/C off-road racing, has just released its new Pro Cat in Europe. Although it's not destined for the States at this time, we've been assured that it's on its way. As usual, *Car Action* will be the first to bring you the full-color scoop on the Pro Cat. Stayed tuned!



SPEEDWORKS STOCKER

Speedworks and Joel "Magic" Johnson have joined forces to produce a ROAR-legal stock motor. This 27-turn motor will have 34 degrees of timing to be competitive on the ROAR stock-motor battlefield. Dubbed the "Joel 'Magic' Johnson Signature Stock Motor," it's in to ROAR for approval and should be legal shortly.

ADVANCE ENGINEERING'S SUPER SCALE

Have you ever seen those 1/8-scale static kits from companies like Monogram? The rumor has reached my ear that Advance Engineering is working on radio-control conversions for these highly detailed kits. So far, there's a Jaguar XKE, a Corvette and a 27-inch T-Bucket; more are sure to follow. Oh yeah, the Custom Street Machine series will soon be available in 1/12 and 1/8 scale.

JUST IN FROM OVERSEAS

A new 2WD off-roader called the Astute has been spotted on the Tamiya test track. Unconfirmed reports say that this car will be in direct competition with all the top contenders like the JR-X2 and the RC10.

Keeping the industry BUGGED, I'll see you next time—or sooner, if I catch you in my spyglass! CC

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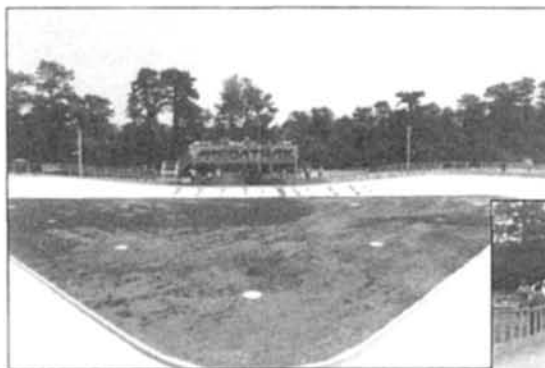
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HOT TRACKS

by BARRY SPINNER

Welcome to "Hot Tracks." Each month, we'll choose an outstanding track to feature in this column. To qualify, send in some high-quality, black-and-white photos of your track, along with a description (approximately 500 words) that shows why your track should be chosen. Send your entries to Hot Tracks, Radio Control Car Action, 251 Danbury Rd., Wilton, CT 06897.

MEGATRAK, BROWN MILLS, NEW JERSEY



MEGATRAK

WHAT HAS THREE corners, is monstrous in size, and is the hottest thing to happen to R/C racing? Answer: *Megatrak*, in Browns Mills, NJ.

Frustrated by the lack of tracks available to them, Ed and Tony Angiuoli decided to build themselves a place to race. Builders by trade and serious R/C racers in their spare time, they set aside 10 acres on which to make the biggest track ever built strictly for R/C racing. It's a cement tri-oval, 410 feet around the center line, with one 175-foot front straight and two 145-foot straights. Owing to racers' demands, Tony and Ed have already started to run races on Friday nights under the lights, which, I'm told, are as bright as Yankee Stadium's! There's also racing on Saturday and Sunday afternoons, beginning at noon. They run all classes—from pan cars to heavy-metal trucks—on every race day. So far, practice has been free of charge, and the race fee is just \$10.

The track was built with the racer in mind. Even though the angles and the degree of banking in turns one and three are the same, the driving line is different, and this makes it a challenge to even the

most experienced racer. An AMB computerized system counts the laps. The transponder pick-up has been buried under the cement to avoid obstructing the view.

Still under construction in turn two is an air-conditioned VIP press box that has a perfect view of the whole track. In the near future, there will be a row of pit buildings with electrical outlets throughout. There's already a concession stand that sells hot dogs (nicknamed "Mega Dogs"), chips and cold soda, and plans for grandstands are in the works. There will also be a trailer or a building containing a store with all the parts racers might need. As you can see, the owners are determined to build a world-class superspeedway for R/C fans.

The track is in south-central New Jersey, and it's easily accessible from any direction. There are two numbers to call: (609) 893-7716 for race information and (609) 893-7743 for directions to the track. If you're looking for a superspeedway and you're tired of just going around and around, Megatrak is the place to race!

Stay tuned to *R/C Car Action* for an upcoming color feature on Megatrak. ■

P A N D A

STADIUM RACER

Danny Thompson's Chevy S-10, in 1/10-scale by RICK HOULE



CHEVROLET S-10

Owner/Builder	Danny Thompson Motorsports
Driver	Danny Thompson
Chief Mechanic	Mike Donovan
Engine Builder	Ryan Falconer Racing Engines
Engine	Chevrolet 60 V-6, 2.8 liter
Chassis	4130 Chromolly tubing
Front Suspension	Double-wishbone type
Rear Suspension	Trailing arm
Tires	BF Goodrich Radial All-Terrain T/A 33x12 50R15, front; 32x11.50R15, rear
Wheels	Alcoa
Transmission Type	3-speed automatic
Rear End	Dana 60
Fuel Tank	Cell type; 4-gallon capacity
Gauges	Stewart/Warner
Plumbing	Earl's Supply Co.
Shocks/Suspension	Hand-built air shocks by Danny Thompson Motorsports, two shocks per wheel
Sponsors	Peak Antifreeze and Summer Coolant Chevrolet BF Goodrich Alcoa-Wheel Division Earl's Supply Co.

HAVING GROWN UP in the famous Thompson racing family, it was inevitable that Danny Thompson would follow in his father's footsteps. Danny's father, the late Mickey Thompson, was the innovator of the off-road stadium races. Mickey envisioned a little "chunk of Baja" brought to stadiums and coliseums throughout the country to delight thousands of spectators who might otherwise never experience this exhilarating type of competition.

In 1987, Danny entered the Grand National Sport Truck Class in the Mickey Thompson Off-Road Grand Prix Series with a Chevrolet S-10, and he has been piloting this awesome machine into the winner's circle ever since.

To keep up with the technology of the competition's new trucks, Danny built an all-new Chevy S-10 in his Motorsports Shop in Huntington Beach, CA, and it's this new version of his Stadium Racer that has been reproduced in a 1/10-scale R/C replica.

Global Hobby Distributors has introduced the latest offering from Panda*. Panda's Danny Thompson Stadium Racer faithfully reproduces (cosmetically, at least!) every detail of its full-size counterpart, from the accurate sponsor logo decals to the exact same tread patterns on the BF Goodrich Radial Mud-Terrain T/A tires!

The Stadium Racer features such goodies as control-link front suspension, four coil-over shocks, Oilite metal bushings, sealed diff, ball-joint transaxle rear end, race-legal 05/540 motor and high-impact motor guard. The three-speed, forward/reverse speed control and its rigid, lightweight, bathtub chassis design is typical of most entry-level R/C cars.

The Chevy S-10 body comes complete with scale-like front and rear stadium-racer bumpers and roll bars, and the number plate proudly displays the number 4, underscoring Danny Thompson's 1987 4th-place standings in the Drivers' Championship.

Though it's unlikely that you'll ever see this car in the A-Main of a ROAR or NORRCA National Event, you can let your imagination run wild as you fly through the air from a coliseum peristyle in front of thousands of screaming spectators while the ESPN cameras record your every move on your way to the checkered flag. Who knows? Maybe someone will organize a production-class race with the Panda Motorsports racer. At any rate, look for a full Track Report on the Stadium Racer in a future issue of *Car Action*.

*Here's the address of the companies mentioned in this preview:

Panda; distributed by Global Hobby Distributors, 10725 Ellis Ave., Fountain Valley, CA 92728.

PACKIN' PINK SLIPS!



by STEVE POND

HERE'S A SNEAK peak at Kyosho's* newest addition to the monster truck market: The Big Boss.

The Big Boss uses the same chassis as the other 2WD trucks in the Kyosho line, and, with its turbine-style wheels and chrome shocks for dampening on each of the four wheels, it's very similar to the Hi-Rider Vette. The Boss, however, doesn't come with the second set of dummy shocks found on the Hi-Rider.

The most obvious difference is the new shell of the Big Boss: It's the first Kyosho truck to bear an American truck body. The Ford F-series short-bed body features a triple-tube roll bar and monster-style front and rear bumpers, and it combines vacuum-formed Lexan (which accounts for most of the body) and injection-molded polystyrene for super detail in the front grill, roll bar, mirrors and bumpers. Bravo!

The final change made to the Big Boss is the addition of new steering hubs (or whatever you're calling them today). These steering hubs are now in their third generation, and the improvements in the material used should prevent any damage—barring a head-on collision with a full-scale truck!

Because the Boss's chassis is the same as the Kyosho trucks introduced in the past, most parts will be interchangeable. The truck will still come with the same plastic bushings that we've found to be inadequate, but this can be rectified with an after-market set of ball bearings. The bottom line: Kyosho offers R/C enthusiasts yet another avenue to explore the wild world of monster trucks.

As soon as we get our hands on one of these beauties, we'll put it through its paces. Until then, keep your ear to the ground for a full-blown review in the near future.

**Here's the address of the company mentioned in this preview:*
Kyosho; distributed by Great Planes Model Distributor, P.O. Box 4021, Champaign, IL 61820.

BIG BOSS



ON THE SCENE

by WALLY DAVID



HITTING THE BIG TIME

Nichelle keeps her JR-X2 ahead of Joel Johnson's Ultima Pro.

NICHELLE RIVERA

Nichelle Rivera. Write that name down, because you're sure to hear more about her. On the West Coast, it isn't unusual to see her beat many of the top drivers you usually read about in race reports, but those of you in the rest of the country might be surprised to discover that 14-year-old Nichelle has a full factory ride with Team Losi and Peak Performance



Motors.

It all started when Nichelle accompanied her uncle to Ranch Pit Shop (Losi headquarters) when he went to buy a speed controller for his R/C car. A race was going on at the time, and Nichelle

found this so interesting that she asked her dad for an R/C car. She was given an RC10 and "He started buying all kinds of stuff for the car, and the next thing I knew, I was racing."

Nichelle started racing in Southern Cali-

JUMPIN' JOHNSON

Jack Johnson is one *hot* driver! Team Losi's newest rising star is *winning* every race in sight. Fresh from wins in three classes at the NORRCA Off-Road Nats, where he TQ'd and won 2WD Stock, 2WD Modified and Monster

Truck, Jack was primed for the big time! He walked away with the TQ trophy and the crown in the 2WD Modified Class at the 1989 ROAR Off-Road Nationals, and he followed that with a 1st in the 4WD Modified Class B-Main—with a time that would have netted him 2nd in the A-Main.

Originally from Las Vegas, NV, Johnson started racing 1/12-scale cars about 10 years ago, and he got into off-road racing when the Rough Rider came out in 1980. He eventually moved to California and then got



Jumpin' Jack (third from right) makes final radio adjustments before winning the 2WD Modified A-Main.



fornia about two years ago and was first picked up by Rick Hohwart for his Peak Performance Motors team, and soon after that, Team Losi spotted her talents. She has been sponsored for about a year and gives much credit to her father, Wally (hey, I like that name), who encourages her. "Without him, I don't think my car would be running right now."

This off-road specialist, who spent this past summer working for Team Losi in its shipping department, would like to try other types of R/C racing, but she doesn't have the time. When she isn't racing or attending school, she enjoys "jet skiing, water skiing and fixing my cars, I guess."

Nichelle finds it challenging to be the only female at most races. "It's kind of neat being the only girl, 'cause you get a lot of attention, but the guys think the *only* reason I'm sponsored is because I'm a girl."

Once she hits the track, no one has to wonder why she has a sponsor; just ask Joel Johnson: He spent at least two to three minutes trying to pass her in the B-Main of the 2WD Modified Class at the 1989 ROAR Off-Road Nats. He eventually got by, but Nichelle wound up 5th to his 4th—just .31 second behind the current World Champ!

Who knows, maybe we'll be calling Nichelle "World Champ"!

involved with Team Losi when he needed help with the Yokomo SE that he was racing at that time. Losi was then importing the car and recognized his driving potential. He has now been with Team Losi for about three years, working full time with Gil Losi Jr. in the R&D department. He's a dedicated racer who devotes all his time to designing and testing the 2WD car.

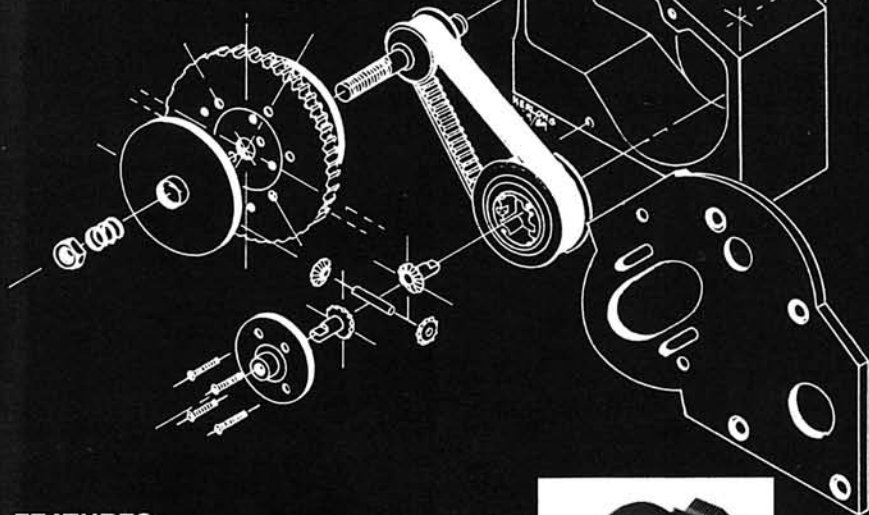
Relaxing is Jack's main interest when he gets away from racing: "Kick back, watch TV, not much else. It (R/C) takes most of my time."

Before he got into R/C, 24-year-old Johnson was a slot-car racer. I asked him how long he sees himself in full-time R/C, and he said, "It really depends on how long it remains popular. I could see myself in this for another five years."

...Five years and *many* championships! ■

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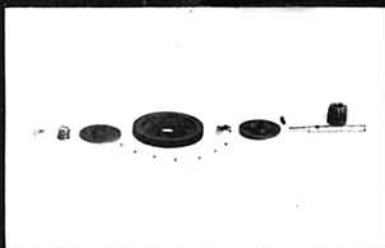
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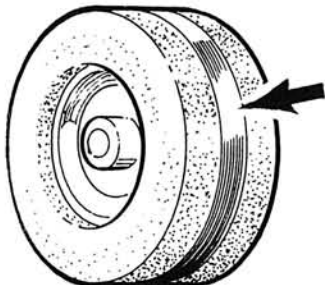
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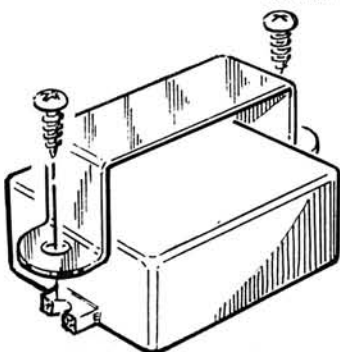
by JIM NEWMAN



STEERING TUNING

Here's a novel way to correct oversteer when using foam on-road tires. To vary the amount of rubber in contact with the road, cut vinyl electrical tape in a variety of widths and wrap it around your front tires. The more tape you add, the less will be your oversteer.

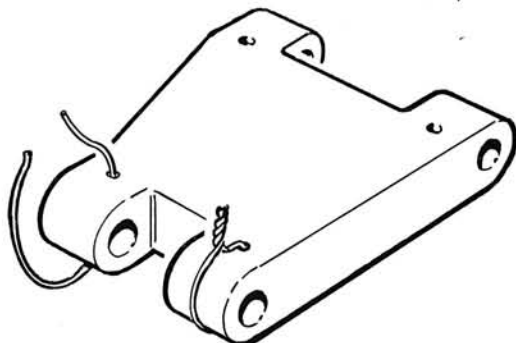
Dean Birkmeir, E. Lansing, MI



SERVO CASE FIX

A broken mounting lug on a servo case led to this owner's neat fix. Although he used a piece of wire with a loop on each end, I've shown a metal strap that might be easier to fabricate from thin aluminum or tin-can stock. A thin piece of sponge rubber between the case and the strap should keep it snug.

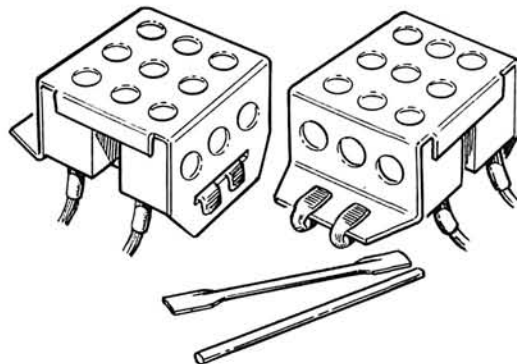
Patrick Brown, Columbus, OH



A-FRAME STRENGTHENING

A-frames (wishbones across the Atlantic) on some cars have a weak spot: The pivots have been known to split open. Drill very small holes where shown, then thread stainless-steel, 26-gauge safety wire through them. Twist the ends together tightly before pressing them down flat, out of harm's way. Visit your local airport mechanic—he'll probably be pleased to sell you 2 or 3 feet for a few cents when you explain what you're doing.

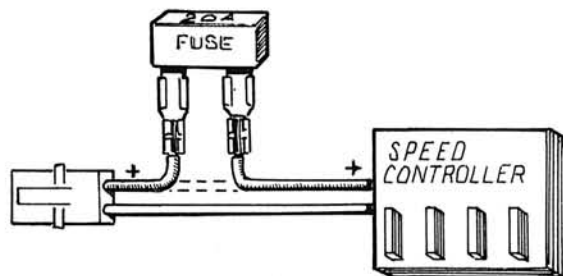
Gary McCool, Harrisville, PA



HEAT-SINK RETAINERS

Our contributor lost the fiberboard retainer and the porcelain heat-sink elements fell out, but he came up with this quick-fix. Cut two 1½-inch lengths of solder, flatten the ends, slide one end into the slots shown above, then bend the tabs down. Now bend the other ends around the flange and crimp them tightly with pliers to get your car back in business.

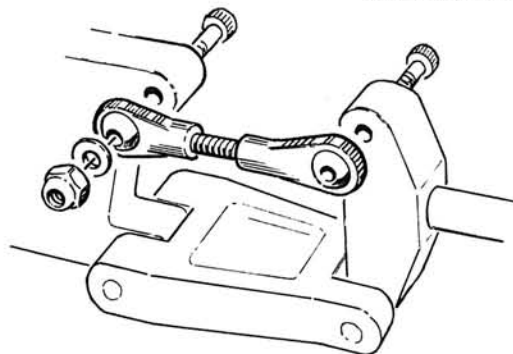
Michael Hahn, Helena, MT



AUTOMOBILE FUSE IN CIRCUIT

This diagram explains how to cut the positive (red) lead from your speed controller, solder on a pair of female spade receptacles, then slip in the appropriate size fuse to protect your motor and controller.

Aaron Mason, Manteno, IL

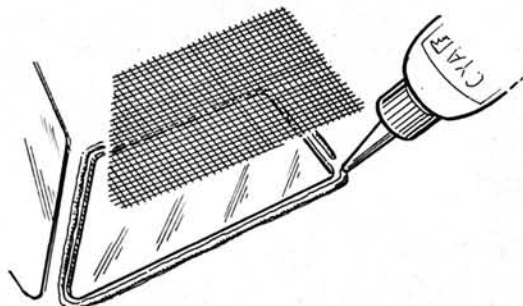


HOTSHOT CAMBER ADJUSTMENT

Usually, the camber (wheel lean-in or -out) on these cars can't be adjusted, but this simple modification changes the situation. A pair of Du-Bro ball links and a threaded rod at each wheel allow the camber to be varied. Our contributor attaches the links with sheet-metal screws, but I feel safer with the stout Allen-head screws, washers and self-locking nuts that appear in my simplified illustration.

Joe Napoletano, Mission Viejo, CA

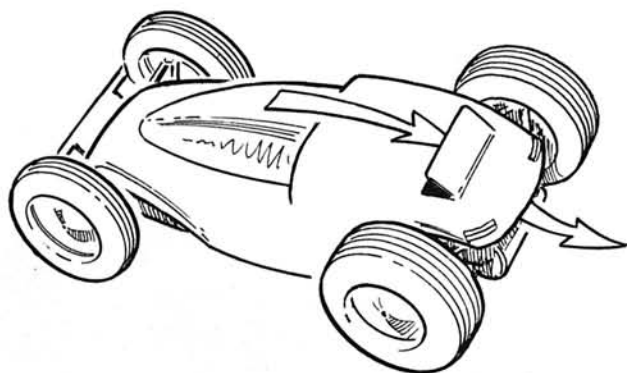
PIT TIPS



SPEED CONTROLLER COOLING — 1

Cut out the side windows in your car and run a bead of hot glue or slow-setting CA around the inside before pressing in a piece of window screen material, which will keep out rocks and most dirt. In cutting out the windows, you could leave enough Lexan to bend outwards like a scoop to direct air into the car and over the controller.

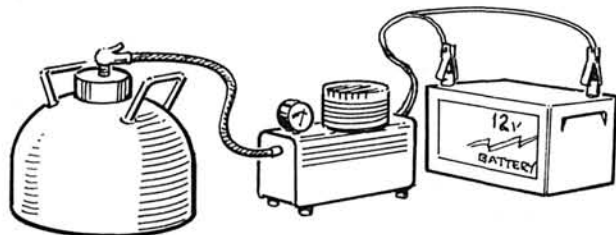
Bob Montgomery, Lindenhurst, IL



SPEED CONTROLLER COOLING — 2

Cut a little flap and bend it upwards at the rear of the car, just ahead of the controller. This will scoop air over the unit.

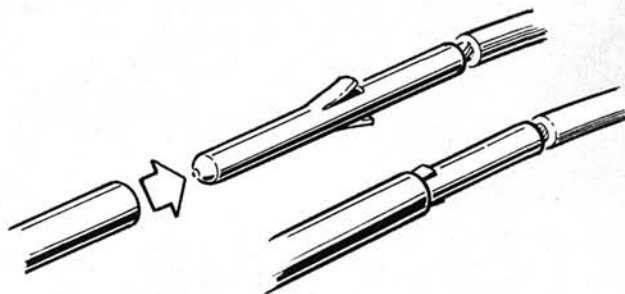
Linc Spangler, Utica, MI



PORTABLE COMPRESSED AIR

For quick clean-up, air at the trackside is very useful. Carry a portable air tank and a 12V compressor that you can run off your automobile battery—Trey's is neatly fitted in a wooden case. He recommends a nonstandard air tank, but for safety, use a Sears or similar ASME-approved portable tank. Be sure to use eye protection while doing so.

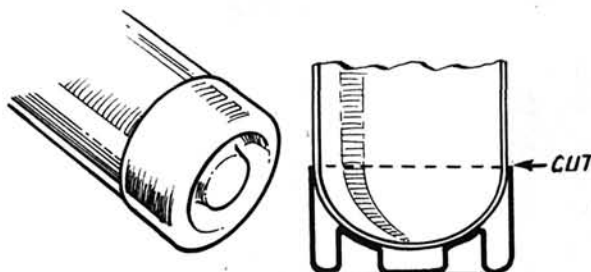
Trey Madigan, Baltimore, MI



CONNECTOR PIN REMOVAL

Obtain a piece of brass or aluminum tube— $\frac{5}{32}$ -inch i.d. for female pins and $1\frac{1}{8}$ -inch i.d. for male pins. As shown here, pressing the tube over the pins will compress the barbs and allow the pins to be extracted through the wire entry-side of the plug body.

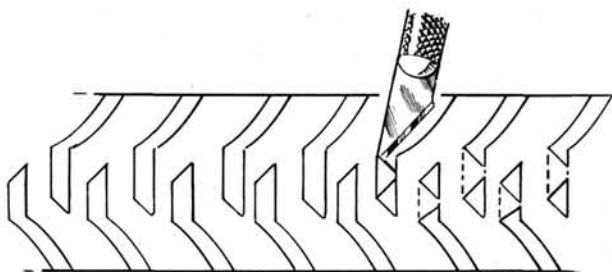
Gene Clevenger, Baltimore, MD



FREE PARTS CONTAINERS

Nick pulls the black plastic base from 2- and 3-liter plastic bottles, then fills the holes. However, one of our model flying friends suggests just cutting the bottle where arrowed, above. This not only provides a parts dish, but also produces a useful bowl for cleaning parts.

Nick Roloff, San Francisco, CA



TIRE TREAD MODIFICATIONS

Our adventuresome contributor experiments with different tread configurations by using a lubricated modeling knife to slice out tread blocks. Here he appears to be trying to improve on the self-cleaning ability of the tread pattern—an interesting experiment!

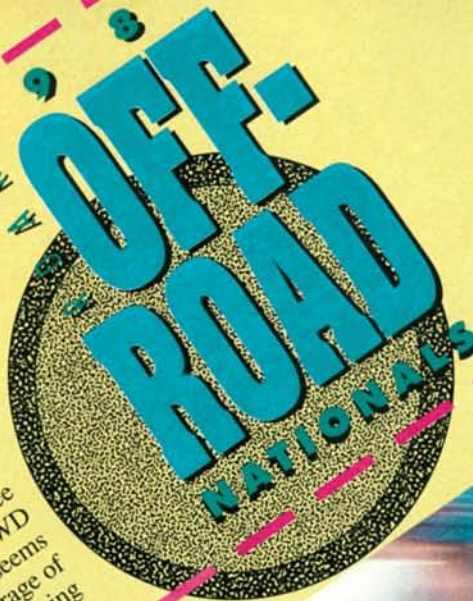
Rod Martin, Saugerties, NY

Radio Control Car Action will give a free one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send rough sketch to Jim Newman, c/o Radio Control Car Action, 251 Danbury Rd., Wilton, CT 06897. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we cannot acknowledge each one, nor can we return unused material.

MOTORIN' IN MOTOR CITY

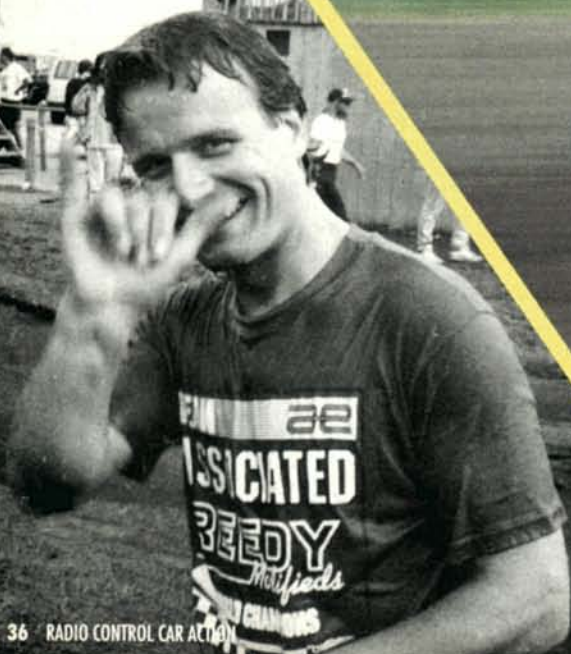
NUMBERS! SHEER NUMBERS! That was the major story of the 1989 ROAR Off-Road Nationals—the largest ROAR Nationals of the year—which took place at the end of July in Sterling Heights, near Detroit, MI.

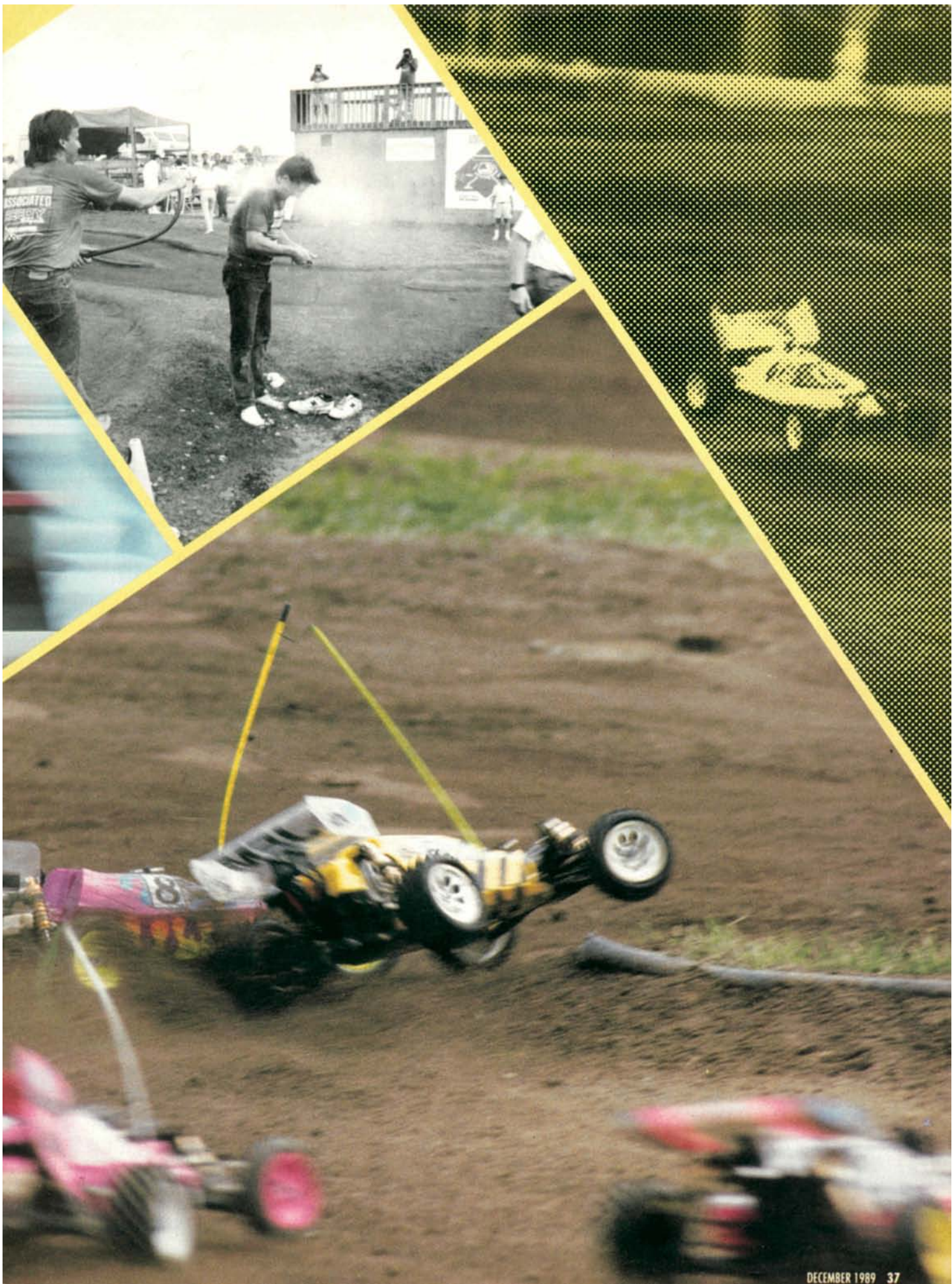
Picture this: 602 entrants in three classes—196 in 2WD Stock; 219 in 2WD Modified; and 187 in 4WD Open. If 602 seems like a staggering number, it is! With an average of 200 cars in each class and one of the classes having



by WALLY DAVID

Cliff Lett:
Soaked to the
skin, but still 4WD
Champ!





to run twice each day to get four rounds of qualifying completed in three days, there were 800 cars to get through technical inspection, 800 radios to keep track of, and 3,200 tires running over the track each day. *Wow!*

Look at it another way: There were 60 heats in each round, for a total of 80 heats each day. Multiply that by 4 minutes per heat, and you get 320 minutes, or over 5 hours of pure racing time. That doesn't even take into account the time SEMROCC members spent grooming the



Dennis Waseck holds the YZ-10 of Tim Walski, a member of Team Skull Racing.

R/C club I've ever encountered. Team Associated's Jay Halsey was so impressed by SEMROCC's contribution that he had "Thanks-SEMROCC" on his information card, along with his sponsors' names.

The track is a very fast one. The cars were "gridded" at the beginning of a long straight that ends in a sharp, 180-degree hairpin followed immediately by another hairpin. From there, the cars power down a short and launch over the track's only high jump. After the jump, there's a sharp, uphill left-hander that leads into a banked right-hand turn to a 90-degree right and down a straight to cross the start/finish line.

At the end of the short straight is a small island, around which are two routes from which to chose, and these

Most people agreed that 602 entrants (or approximately 2,408 wheel nuts) were too many. Entrants for Nationals will, in future, probably come from among regional qualifiers, with the rest of the field being filled by open registration. The goal is to keep the number of entrants down to a more manageable 300 (or 1,200 front wheel bearings!).

Well, enough of numbers, for now. As expected, qualifying times for the 2WD Stock Class (using Trinity hand-out motors) were extremely tight, with the top 10 all turning 10 laps and with only 6 seconds between the top qualifier's time and that of the tenth fastest. Michael Ankney, driving an RC10, grabbed TQ honors with a 10-lap run in 4:11.34. Second fastest was the RC10 of Jon Anderson, with a time of 4:12.56, and his car was followed by Steve Chamberlain's RC10 in 4:14.46.

As you might expect, the 2WD



track between most heats.

Headed by ROAR Administrator John Thawley, the SEMROCC people were absolutely amazing. No sooner had the last car cleared the track after a heat, than the SEMROCC gang was all over the place: watering, rolling, tamping and raking the track back into racing shape. Obviously, they really wanted to maintain the same track conditions for every race, and many members had taken vacation time for Nationals week to get the track and grounds ready for the invasion. When they weren't working on the track, they staffed the tech and radio impound tent. This is the most enthusiastic

are followed by a series of switchbacks and moguls. The moguls end in a left-hand turn that brings the cars to a long, double-apex right-hander that leads back to the long straight. The track has no major jumps, and this disappointed many of the West Coast racers who are used to getting a lot of air, but the high speeds made the racing exciting.

This will probably be the last time we see open registration for national events, as ROAR is expected to introduce a qualifying system for the Nats.



Modified Class was slightly more spread out, because motor power is added into the equation, as are increased driver skills and car prepara-



Gil "Pops" Losi Sr. enjoys Team Losi's Jack Johnson TQ and win in 2WD Modified.

tion. Only four of those who qualified for the A-Main were able to turn 11 laps. Jumpin' Jack Johnson (Team Losi's rising star), driving a Revolution-powered JR-X2, took the pole with 11 laps in 4:29.76, and Team Associated's Cliff Lett was less than 1 second behind, with a time of 4:19.12. His RC10, with a still very hush-hush gearbox and a Reedy motor, was nearly 6 seconds faster than the RC10/Reedy combo of teammate Rick Vehlow. (I told you the Class was more spread out.)

As for the 4WD Open Class, Qualifying was a Yokomo Show. Imported by Associated, the YZ-10 took the top four spots and seven overall in the top 10. The top four YZ-10s, all using Reedy



power, were led by Cliff Lett with 11 laps in 4:06.23. Butch Kloeber was second fastest with a time of 4:12.02, followed by Jammin' Jay Halsey in 4:14.74. Rick Vehlow backed up his 3rd-place qualifier in 2WD Modified with a 4th-place starting spot in 4WD—less than 1 second behind Halsey. All 10 A-Main qualifiers completed 11 laps.

A number of well-known drivers were conspicuously absent from the A-Mains of both the 2WD Modified and 4WD Open Classes. This





doesn't necessarily signify a decline on their part, but it does show an expansion of the field of drivers who are able to make it to the A-Main. Because of improvements in the

motors, batteries and cars available, there are now more drivers who can place very highly at national races. I think it makes it more interesting to see new names showing up in the "win" column.

With the qualifying finished, we looked forward to the Sunday's

Mains, but before I get to those I'll reveal some of the things that go on at a national competition after racing is over for the day—a wild Wally shocking exposé of driver debauchery?!

As is the usual after major races, most racers didn't get back to their hotel rooms before eight or nine o'clock. After a quick shower to wash away the day's grime, it was off to a restaurant. I don't know how this happens, but without conferring, everybody seems to wind up at the



Left: Steve Chamberlain with the 2WD Stock 1st-place trophy that was won with his RC10.

2WD STOCK A-MAIN

Fin	Qual	Laps	Name	Chassis	Motor	ESC	Tires (f/r)	Body
1	3	10	Steve Chamberlain	RC10	Y	Novak	Losi/Schumacher	RCPS
2	8	10	Tyree Phillips	JR-X2	T	Novak	Losi (f/r)	Losi
3	9	10	Freddie Rapuana	RC10		Novak	Schumacher (f/r)	RCPS
4	10	10	Kyle Reed	JR-X2	I	Novak	Losi (f/r)	Losi
5	2	10	John Anderson	RC10	N	Novak	Associated/Losi	RCPS
6	5	10	Craig Lair	A&L		Titan	Losi (f/r)	Andy's
7	1	10	Michael Ankney	RC10	I	Novak	Schumacher (f/r)	RCPS
8	7	10	Terry Yarbrough	RC10/Top Cat	R	Novak	Schumacher/Associated	Schumacher
9	6	10	Dan Fisher	JR-X2		Novak	Schumacher (f/r)	N/A
10	4	9	Glenn Ornat	JR-X2	T	Novak	Losi/Associated	Losi

2WD MODIFIED A-MAIN

Fin	Qual	Laps	Name	Chassis	Motor	ESC	Tires (f/r)	Body
1	1	11	Jack Johnson	JR-X2	Revolution	Tekin	Losi (f/r)	Losi
2	4	11	Kyle Reed	JR-X2	Revolution	Novak	Losi (f/r)	Losi
3	5	11	Mike Dunn	JR-X2	Race Prep	Novak	Losi (f/r)	Losi
4	2	11	Cliff Lett	RC10	Reedy	Novak	Schumacher (f/r)	RCPS
5	3	10	Rick Vehlow	RC10	Reedy	Novak	Losi/Schumacher	RCPS
6	7	10	Steve Dunn	JR-X2	Race Prep	Novak	Race Prep/Losi	Losi
7	9	10	Jay Halsey	RC10	Reedy	Novak	Losi/Schumacher	Associated
8	8	10	Rick Hohwart	JR-X2	Peak Perf	Tekin	Losi/Hot Laps	RCPS
9	6	10	Butch Kloeber	RC10	Reedy	Novak	Losi/Schumacher	RCPS
10	10	DNS	Eustace Moore Jr.	RC10/MIP	Reedy	Novak	Losi/CRP	RCPS

2WD OPEN A-MAIN

Fin	Qual	Laps	Name	Chassis	Motor	ESC	Tires (f/r)	Body
1	1	11	Cliff Lett	YZ-10	Reedy	Novak	Yokomo/Schumacher	Yokomo
2	9	11	Kurtis McElroy	YZ-10	Twister	Novak	Associated/Yokomo	Yokomo
3	8	11	Gil Losi, Jr.	Lazer	Revolution	Tekin	Yokomo/Schumacher	Kyosho
4	3	11	Jay Halsey	YZ-10	Reedy	Novak	Hot Laps/Schumacher	Yokomo
5	2	11	Butch Kloeber	YZ-10	Reedy	Novak	Yokomo (f/r)	Associated
6	7	11	Chris McElroy	YZ-10	Peak Perf	Novak	Hot Laps/Schumacher	Yokomo
7	6	10	Ron Rossetti	Lazer	Revolution	Novak	Schumacher (f/r)	Kyosho
8	5	10	Kris Moore	Lazer	Twister	Novak	Yokomo/Associated	Kyosho
9	4	10	Rick Vehlow	YZ-10	Reedy	Novak	Yokomo/Schumacher	Yokomo
10	10	10	Mike Ebert	YZ-10	Reedy	Novak	Yokomo (f/r)	Yokomo

Below: Jumpin' Jack Johnson TQ'd and won the ROAR 2WD Modified Off-Road Nationals with a JR-X2.



Left: With the help of his Yokomo YZ-10, Cliff Lett is the 4WD Open Champ.



same place to eat. One night, it's a steakhouse; the next, it's Mexican. My theory is that, by telepathy, everyone has a hankering for the same kind of food on a given night. One night, I had dinner with Team Twister, and who showed up, but racers from Team Associated, Race Prep, Kyosho, Parma and Bob Novak.

After dinner, we decided to be original and go to a local go-cart track for some fun. Well, I guess we



Dirt is kicked up as these A-Main hopefuls blur into motion.

Right: A happy Eustace Moore Jr. takes a break from working on his MIP/RC10 4WD car.



weren't so original, as most of the people we saw at the restaurant had been at the track. I recognized at least 50 of the racers motoring around. You could tell the racers by the way they took proper racing lines around the track, and by the way they looked behind to block others. The highlight of the evening was when, on the straightaway, Associated's Jammin' Jay Halsey pulled alongside teammate Butch Kloeber, and Mike and Steve Dunn of Race Prep. Jay had an evil grin as he decided to make a hard right, so putting Kloeber and the Dunn brothers into the tire barrier. On the next lap, much to the amusement



of the racers waiting in line, all four were given the boot by the track management. As I passed Parma's Andy Dobson, I yelled, "This is the only time I'll ever pass *you* on a race-track!"

That's how many racers and crews get out, have fun and blow off steam after a day's racing and thrashing (and those of you who thought I was *really* going to tell can relax now!).

As the sun came up on Sunday, everyone was prepared for the mains. The first A-Main was for the 2WD Stock Class. Steve Chamberlain, starting in the 3rd spot and piloting an RC10, jumped out to an early lead over Tyree Phillips, who drove a JR-X2, and Freddie Rapuana, at the wheel of an RC10. Chamberlain ran away and hid, and eventually won the race by 9 seconds, with 10 laps in

4:05.76. Tyree Phillips came 2nd with a 4:14.68, and he was followed by Freddie Rapuana's 4:18.25. Kyle Reed's JR-X2 came in 4th, just .20 second out of 3rd. Nine of the 10 racers in the A-Main turned 10 laps, and 5th through 9th were separated by only 4 seconds.

In the 2WD Modified A-Main, driving a Reedy-powered RC10, Cliff Lett got the holeshot, after starting on the outside pole, but it was the Revolution-powered JR-X2 of Kyle Reed that came around in the lead for the first lap. Reed was followed closely by Losi teammate Jack Johnson, and Mike Dunn, driving a JR-X2 with a Race Prep powerplant. Reed seemed to be pulling away from the field, and then Jumpin' Jack took off in hot pursuit, leaving Mike Dunn to fight off the charge of Lett, and Reedy/Associated teammate Rick Vehlow. Amid shouts of caution from Gil "Pops" Losi, Sr., Reed and Johnson staged a dice for the lead, with Johnson coming out on top, and driving to win with 11 laps in 4:19.28. Reed finished 2nd with 11 laps in 4:22.78, and he was closely followed by Mike Dunn on the same lap, only 1 second behind, in 3rd. Cliff Lett came in 4th, 4 seconds behind Dunn. The first four drivers were the only ones who completed 11 laps, and the



Team Associated's Jay Halsey (left) and Butch Kloeber hold Radio Control Car Action decals. Even after being kicked off a nearby go-cart track for rough driving the night before, they were still smiling!

others completed 10. Driving with renewed enthusiasm, MIP's Eustace Moore Jr. qualified 10th, but failed to make the start.

Notable names in the B-Main included former World Champion Gil Losi Jr., who won the race, current (as I write) World Champion Joel Johnson of Kyosho and Trinity, and Team Losi's Ron Rossetti. Having names like these in the B-Main certainly made it very interesting.

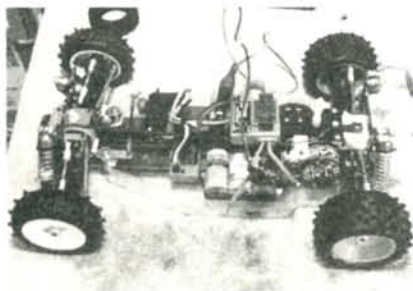
The final—and most exciting—race of the weekend was the 4WD Open A-Main. After the lead had been traded among nearly all the drivers, things shook out to show Jammin' Jay Halsey, driving a Reedy-powered Yokomo YZ-10 in the lead, being hounded by the

Reedy/Yokomo of TQ Cliff Lett. The next action drew boos from the crowd: Halsey was heading into the switchbacks, when his YZ-10 started to lose rear traction. As he spun, Lett, who was just inches behind, tapped the inside rear of his car and sent him spinning and onto his lid. Gil Losi Jr., driving a prototype Kyosho Lazer with Revolution motivation, and Kurtis McElroy, with a Twister-powered YZ-10, slipped past Halsey. Lett appeared to wait, as if to see whether Halsey would get going quickly, but as Losi Jr. and McElroy were closing, Lett got going again, finishing with 11 laps in 4:12.05—over 5 seconds ahead of McElroy, who was 1 second in front of Losi Jr.

(Continued on page 46)



Joel Johnson had an Ultima with many of its integral parts made of machined aluminum by Tecnacraft.



Driven by Chris Doesek, John Thawley's YZ-10 featured an aluminum chassis and suspension parts made by Corally. It isn't yet known if these parts will be available in the States.



The Schumacher Cat of Parma's Andy Dobson sports Lunsford trailing arms and Losi JR-X2 universal shafts.

(Continued from page 42)

Halsey wound up in 4th and seemed very upset, leaving the drivers' stand without speaking to anyone.

Things seemed to cool down, as Lett, in a post-

drivers drenched Cliff with a water hose! Apparently, they had all agreed that the Associated drivers would get to soak any teammate who won an A-Main.

So after 4,018 sub C-

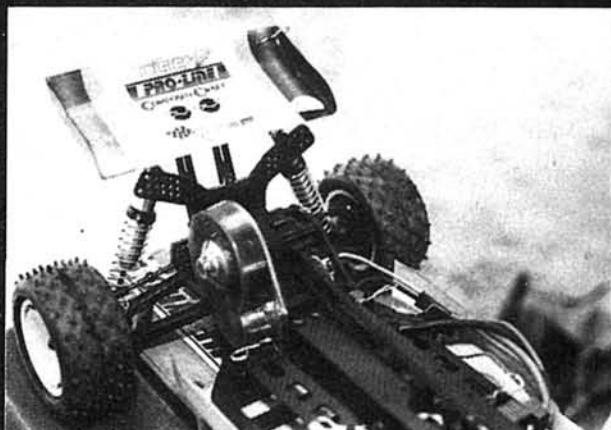


Trinity's Tony Neisinger, seen here working on his Cat with a JR-X2 rear suspension, had a difficult Nats. He suffered from inexplicable radio problems that limited his best qualifying total to three laps.

race interview with John Thawley, explained to the crowd that if Halsey's car hadn't flipped, he would have waited, and allowed Jay to take back the lead. He said it was a tough way to win a race, especially as they're teammates. Things cooled down even more when the other Associated

cells had been charged and run, the 602 came down to three 1989 ROAR Off-Road National Champions are Steve Chamberlain (2WD Stock); Jack Johnson (2WD Modified); and Cliff Lett (4WD Open). Those are some pretty impressive numbers. ■

LAZER: WEAPON AGAINST CATS AND YOKS



by WALLY DAVID

THIS YEAR'S ROAR Off-Road National Championships showcased a number of new products being raced by factory drivers. By far, the most important product being tested was the new 4WD Lazer from Kyosho, which is not, I repeat, *not* a variation of the Optima.

Several aspects of this car make it especially interesting. The transmission is a double-belt system, with a totally enclosed belt to drive the rear wheels, and an open belt running to the front. The front and rear both have ball diffs—no gears here!—and an under-tray is used to keep dirt out of the drive system. Both belts can be removed without removing the transmission. The rear suspension can be removed by taking out six screws, while just four screws are used to hold the front diff housing. All this makes the Lazer easy to maintain—a unique quality for a 4WD car.

Another interesting feature of the Lazer is its deep hub design, which allows the front and rear hub-carrier assemblies to fit inside the wheels. This allows better weight distribution and suspension travel, and, at the same time, protects the parts from damage. The A-arms are longer to accommodate the deeper hubs, which brings their width to the ROAR legal limit and provides more lateral stability.

Suspension geometry is also improved on the Lazer. The team drivers were still experimenting with shock positions, but the projected overall effect will be increased suspension travel, with the chassis stretched just a hair.

Among those running the car were the entire Kyosho team, including Joel Johnson; Gil Losi Jr.; Ron Rossetti and the rest of Team Losi; along with Kris Moore of Twister. Losi Jr., Rossetti and Moore all made the A-Main with the new Lazer, with Losi Jr. taking 3rd, Rossetti, 7th, and Moore, 8th. Not bad for a car so new that the drivers weren't even sure of its name! Keep your eyes peeled for this new burner: It's sure to renew the battle for four-wheel supremacy. ■



Joel Johnson holds the new Kyosho Lazer.

BUZZ WORDS! Everyone has heard them. In the radio-control world, RTR (ready to run) and ARR (almost ready to run) are familiar to many, and now there's a new one: SLR, or starting-line ready. This concept, introduced by Aristo-Craft* with its 4WD Wildebeest, decreases the time needed to get ready for the track.

Now, you may be thinking that a true R/C vehicle means either paying \$500 for a kit or spending 30

hours building one. Advances in design and improvements in parts have changed all that. Granted, most of the completely assembled vehicles are aimed at the entry-level R/C fan, but manufacturers are taking the design know-how and performance features of the big-buck kits and providing the entry-level user with an economical vehicle that won't end up in the junk pile, as many of the toy-like, fully assembled cars do. This trend is evident in the Wildebeest, Aristo-

Craft's latest entry.

The Wildebeest SLR monster truck is a 1/10-scale 4WD vehicle that has the performance and the ground clearance to wrestle with the best of them. It features:

- chain-driven, dual-differential gearboxes
- independent rear swing-arm suspension
- double-wishbone front suspension
- fully adjustable oil-filled shocks
- oil-less bronze bushings that can be upgraded to ball bearings



THE NEW WILDEBEEST

by FRED MURPHY



- mechanical, 3-step speed control with reverse
- heavy-duty, nylon-injected parts for durability
- Mabuchi RS540S motor driving a 25.4-to-1 gear ratio for monster-truck power
- giant spoked tires on all four wheels
- a Challenger 250 stick radio system

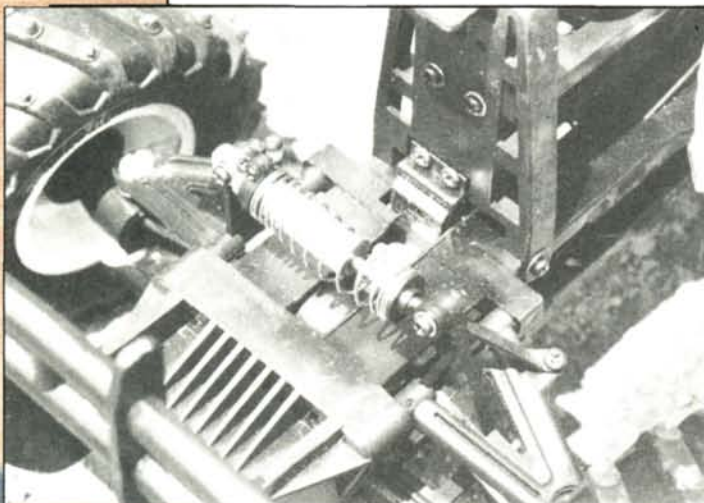
Everything is completely assembled, and the Lexan body is pre-painted. To make it starting-line ready, all you add is a battery pack and eight AA batteries to the radio. The box that the Wildebeest comes in has a handle on it so that

it's easy to carry to the field. Also included in the kit are a colorful decal sheet, a tool bag with a lug wrench, an Allen wrench to adjust chain tension and even a spare battery connector, just in case the polarity of your battery pack doesn't match that of the Wildebeest.

A real plus is the complete manual for the radio system and for the truck, with assembly pro-

cedures and detailed diagrams of all the key components. Both these manuals also include a detailed spare parts list with re-order part numbers. (It's very difficult to repair or troubleshoot most fully assembled vehicles, because you don't know how it goes together or how many parts you'll need to repair it.) Excluding decal time, the Wildebeest can be starting-line ready in about 5 minutes. The radio of the truck I tested didn't even need trimming out before running. The 25.4-to-1 gear ratio provides power for climbing the steepest hills, but keep in mind that the Wildebeest is designed for power, *not* for blazing speed. The top speed is good, but don't expect to beat an expensive racing buggy. If you want to climb over a rock pile, crush some cars or give a weighted sled a pull, you'll like what

(Continued on page 51)



The new Wildebeest retains the double-wishbone/mono-shock front suspension.

ARISTO-CRAFT

WILDEBEEST

Type 4WD monster truck
Scale 1/10
Sug. Retail Price \$199.95

DIMENSIONS:

Overall Length 18.1 inches
Width 11.8 inches
Height 11 inches
Wheelbase 10.5 inches
Front Track 9.15 inches
Rear Track 9.5 inches

WEIGHT:

Gross (w/bat.) 5.25 pounds

BODY:

Type Pickup truck
Material Pre-painted Lexan

CHASSIS:

Type Dual rail
Material Nylon-injected ABS

DRIVE TRAIN:

Primary Pinion/spur
Transmission Chain drive
Differentials Gear
Bushings Bronze bushings

SUSPENSION:

Front: Type Double wishbone
Dampening ... Single oil-filled, coil-
over shock
Rear: Type Trailing arm
Dampening Dual oil-filled shocks

WHEELS:

Type (f/r) Plastic
Dimensions (DxW) (f/r) 2.5x2 inches

TIRES:

Front/Rear Spiked rubber

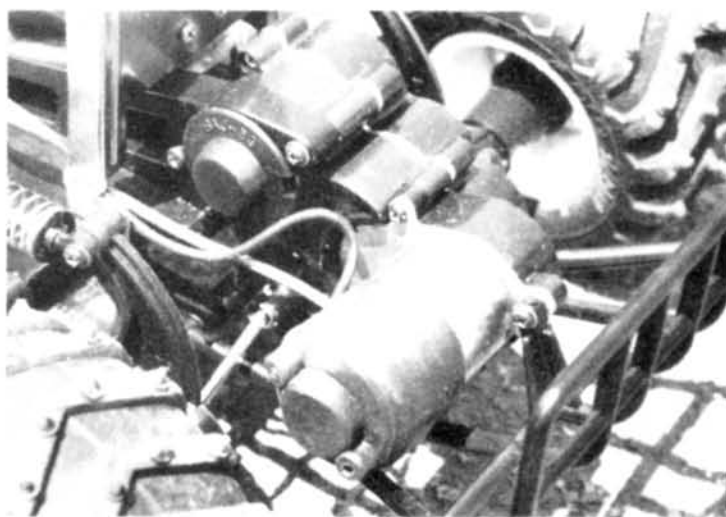
ELECTRICS:

Motor Mabuchi RS540S
Battery Req'd 7.2V or 8.4V
flat pack (not included)
Speed Controller 3-step forward/reverse
Radio Challenger 250 twin-stick

OPTIONS AS TESTED None

COMMENTS:

This fully assembled truck is truly starting-line ready. A great entry-level or first-time truck as well as an exciting performer for the experienced user. Excellent manuals included. Front and rear bumper provide protection from head-on impact, but care should be taken to prevent impact of the large tires and wheels. No parts damage occurred, but the front dogbones were knocked out a few times. Top speed of the Wildebeest was limited because of high-torque gear ratio, but low-end power was excellent.



The 25.4:1 gear ratio inside the two gearboxes provides excellent climbing power, not top-end speed.

he Wildebeest has to offer.

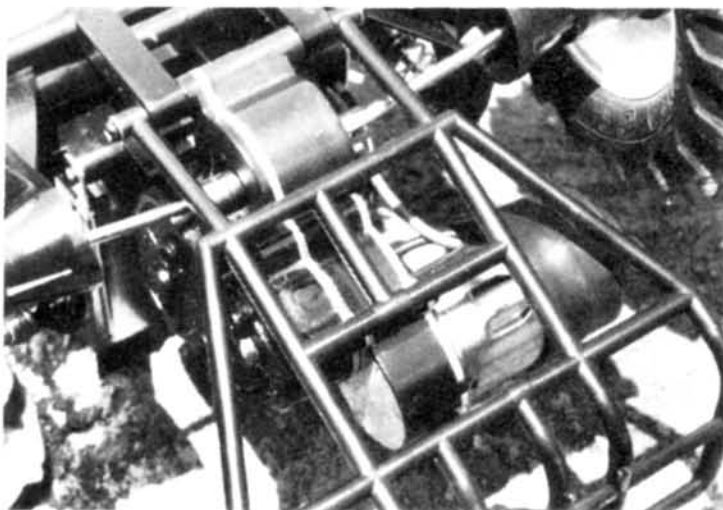
On the test track, the Wildebeest's front monoshock system, dual rear shocks and trailing arms provided very good cornering ability for a truck with very little slide. Of course, top speeds are limited because of the low-end power of this truck. The front and rear bumpers provide excellent protection on direct contact, but watch out for wheel contact, because, as with most monster trucks, the large, oversize tires are exposed beyond the protection range of the bumpers. In the impact tests performed on this exposed area, the Wildebeest sustained no parts damage. The front dogbone tended to pop out, but this is certainly preferable to broken parts.

Running time per battery pack was well more than 8 minutes, which was

excellent. Climbing over obstacles, e.g., curbs, rocks and other R/C cars, was easy, and there was power to spare. The chain-drive system powered the Wildebeest over the toughest terrain without a slip, and it pulled all four wheels through the mud with true monster-truck response.

Performance, monster power, good handling and a radio are all in a completely assembled truck. What more could an R/C fan ask for? The Wildebeest offers the monster-truck lover excitement and fun without the frustration of long building hours. *Monster truckers beware!*

**Here's the address of the manufacturer mentioned in this article:
Aristo-Craft; distributed by Polk's Model Craft,
346 Bergen Ave., Jersey City, NJ 07304. ■*



A birdcage protects the rear gearbox.

BUILDING IT RIGHT

GET READY BEFORE YOU BEGIN

by WALLY DAVID

I'VE SPENT SOME time working in a hobby shop, and I've met many people with various levels of experience in the R/C hobby. One of the things that has become apparent to me is that many R/C hobbyists *don't* read the instructions!

Time and again, customers came into the hobby shop where I worked with questions about the cars they were building. Invariably, the answer was something that could be found in the instruction manual and, invariably, after much coaxing, they'd admit that they hadn't really read the instructions.

I can't tell you the number of times that I've answered technical questions over the phone since I've come to work here at *Car Action*. Nine times out of ten, the callers are amazed that I can usually answer their questions, but I often know the answer only because I read the instructions that they should have read!

I admit that I've built a car or two without reading the instructions carefully. The result, however, is a lot of wasted time, because I missed some information that wasn't evident in the pictures. I'm guilty of having to take apart a front end because I used the wrong size screw!

Because of these experiences, I think it's time to address the situation, and I've decided to write a series of articles on how to build a car *properly*. I'll discuss the process of constructing a car right from the beginning, by *really* following the instructions, organizing the parts in the kit and using the proper tools and supplies. I'll also tell you what to look for to make sure the parts fit together properly, and what to do if you absolutely can't figure out why something in the process isn't working.

For this series, I've chosen to build the Yokomo YZ-10, because I've never built one before. I've found that if you've built one car from a particular manufacturer, you can probably build another by following what you know about that manufacturer's methods. Although the YZ-10 is imported by Associated, it bears no relation to the RC10, of which I've built many. Since I'm not very familiar with this car, I won't know the "ins and outs" and what to look for, so this project should be very informative for all of us.

Bear in mind that what you learn in this series applies to the



These are the things needed to make the project go smoothly. From left: ratchet screwdriver, locking pliers, Bondhus ball drivers, Archer nut-driver set from Radio Shack, servo tape, needle-nose pliers and, of course, the Swiss army knife.

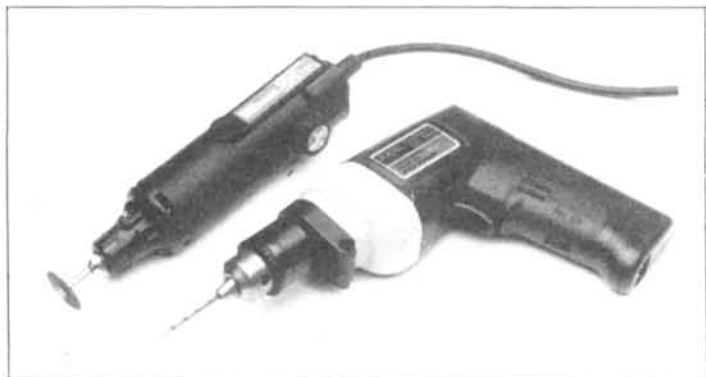
construction of any R/C car, not just to the YZ-10, and I chose it for illustration purposes only. In this first installment, I'll cover the basic steps of preparing to build the car.

Instructions

Read them!!—and read them *before* you begin building! They usually list the tools you'll need to complete the car. If you read them before you start, you'll be familiar with each step when you come to it, and this will make things go more smoothly. Believe me!

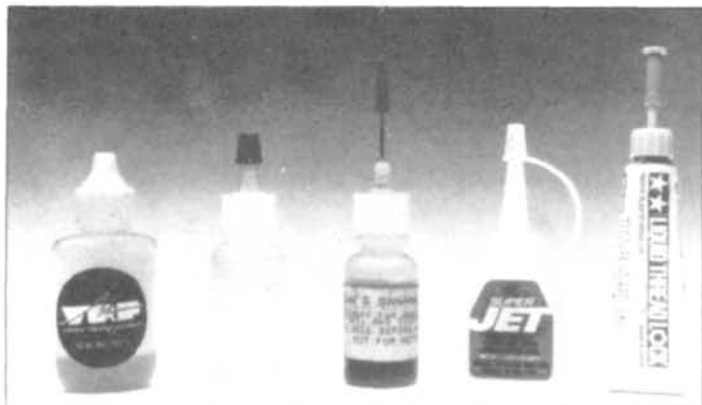
As I open the assembly instructions for the YZ-10, I'm confronted by a list of tools and supplies that I need. Luckily, I have everything listed, but instead of hand files, I'll use my handy Dremel tool. I see that I need to use wooden toothpicks to install the diff balls, but since I've just moved into a new apartment and I don't have any toothpicks, I'll use some old Allen wrenches. Other than those two things, I'm all set.

The instructions seem to be pretty



A rotary power tool and cordless drill are very helpful.

BUILDING IT RIGHT



VRP Lubribearing (part of the Lubrisystem), silicone lube, Dan's Banana Lube, Super Jet CA and Tamiya Liquid Threadlock help keep the car's parts attached and moving smoothly.

good. Most of the pictures are quite sharp, with plenty of arrows and white lines drawn in to make things even clearer. Each time I open a new bag, I have a list of the contents right there in the instructions, not at the very end, as in most manuals. I like that! There are four photos on each page, including shots showing exploded views of the parts and what the assemblies should look like when the steps are completed. It looks as if this will be a pretty straightforward project.

Here's a list of tools and supplies that are usually needed to build a car. You won't actually need all of them for the YZ-10, but I'll include them anyway.

Tools

- **Ball drivers:** Bondhus makes an assortment of ball drivers that can be substituted for the kit-supplied Allen wrenches. I find the ball drivers much easier to use because they allow you to get at the Allen screw from any angle, not just from head-on.
- **Nut drivers:** Radio Shack sells a set of eight useful nut drivers that come in metric or standard sizes.
- **Screwdrivers:** My favorite screwdriver is the ratchet-handle type that comes with multiple bits. I prefer this type to the elec-

tric screwdrivers because the electric ones have a tendency to strip out the screw heads or the plastic. The ratchet is a good compromise, as gives you good leverage without wearing out your wrist. For tight places, I use the Radio Shack eight-piece screwdriver set.

- **Hobby knife:** A

medium-size knife like those made by X-Acto or ProEdge work well for our purposes.

- **Pliers:** A good pair of needle-nose pliers is a must, and locking-type pliers come in handy when you need to get a solid grip on something.

- **Swiss army knife:** This is the most versatile tool in my box; the only thing it doesn't have is pliers. The knife blades are very handy, as are the scissors, different sizes of screwdriver blades, file, awl and tweezers.

- **Rotary power tool:** This is the second most versatile tool in my box; it's like having a small machine shop. The various cutting, grinding and sanding bits have helped in many tasks. This tool can help you remedy many manufacturing imperfections. (I hope I won't need to do much of that!) Dremel is the most famous name in rotary tools, although Sears, Master Mechanic and others sell them, too.

- **Electric drills:** Little needs to be said about electric drills. Try to get a rechargeable, cordless one, as it will be much more convenient at the track. Variable-speed drills are nice, although I get along with a single speed one.

- **Soldering iron:** I recommend that you

buy the most powerful one you can get. I like the Ungar, because it has a temperature-adjustment control. It can be turned down when you don't need it, but doesn't take forever to heat up again.

Supplies

- **Lubes:** My favorite lubricant is Banana Lube from Dan's RC Stuff because I like its banana scent. It is good for bearings, suspension hinge pins and many other things. The label warns that it shouldn't be used for motors, so don't! A number of other silicone lubes also do a very good job: Bud's Racing Products and Trinity are two examples. VRP has a complete setup, called Lubrisystem, and it takes care of most lubricating needs.

- **Glues:** These are a very important part of most building projects. Most cars need some type of instant glue; Jet and Zap are the most popular. Be very careful when using these products, as you could become more attached to your car than you want to be! They'll instantly bond your skin to whatever you come in contact with, so beware!

- **Thread-locking compound:** This is another mandatory supply. Don't confuse this with instant glue, or you'll be in trouble. Thread-locking compound prevents screws from vibrating out, but they can be easily removed with a little pressure. Don't use instant glue for this, because you might not be able to remove the screws when you want to. Tamiya's Liquid Threadlock works well, and it's found in most hobby shops.

- **Servo tape:** This is used to hold down servos, receivers, speed controls and switches. There are very many brands to choose from, but avoid the thick, white type, because it doesn't work very well.

That's all for now. Next time, I'll start the building. I hope you enjoyed this first installment of "Building It Right." I think I might benefit from this as much as you will!

ATOMIC HAMMER!

MK/PACESETTER R/C

NITRO

NATIONALS



DRAG RACING!—the smell of burning nitro and rubber and the crisp crackle of raw horsepower pouring out of mega-horsepower engines!

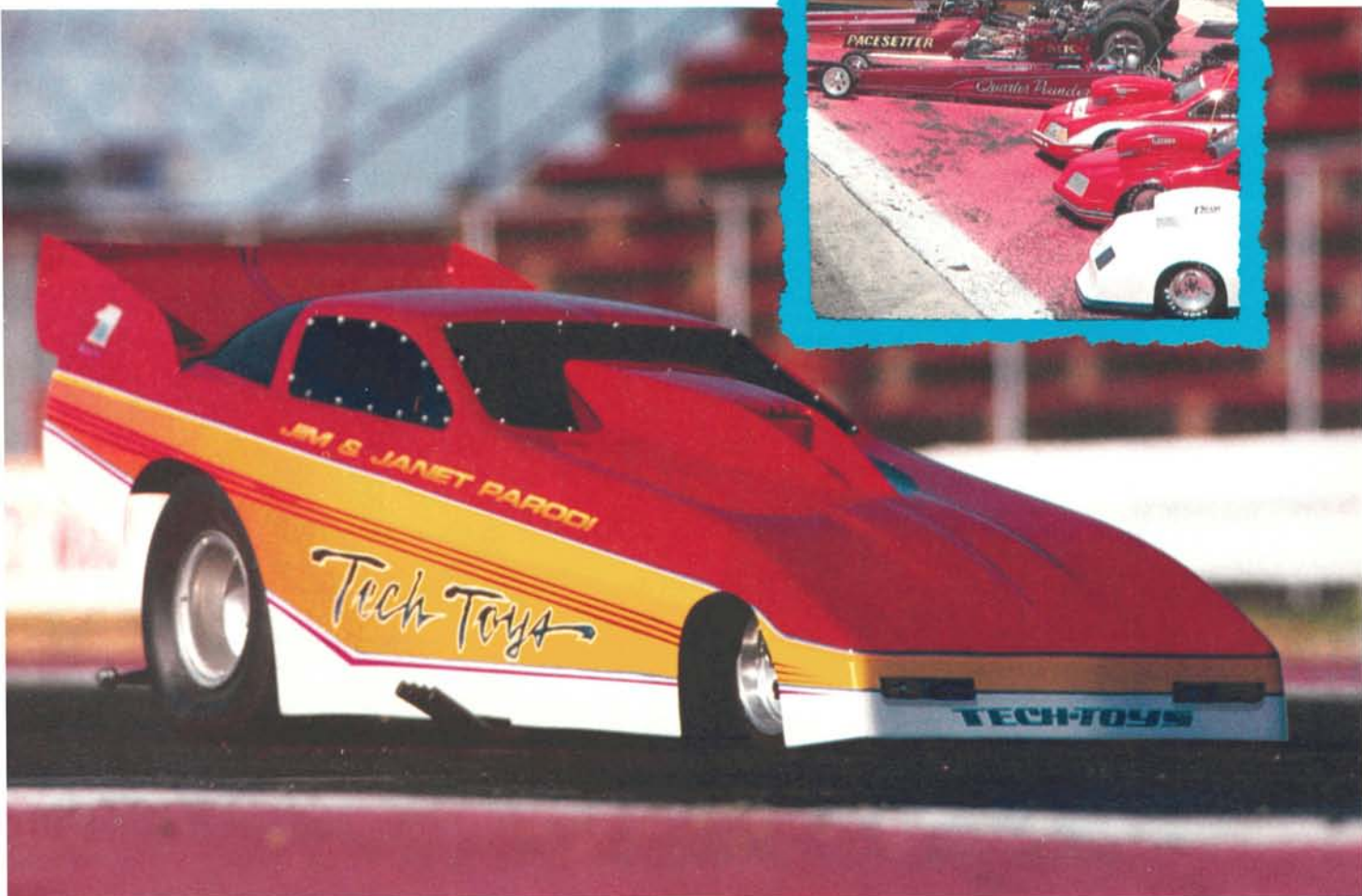
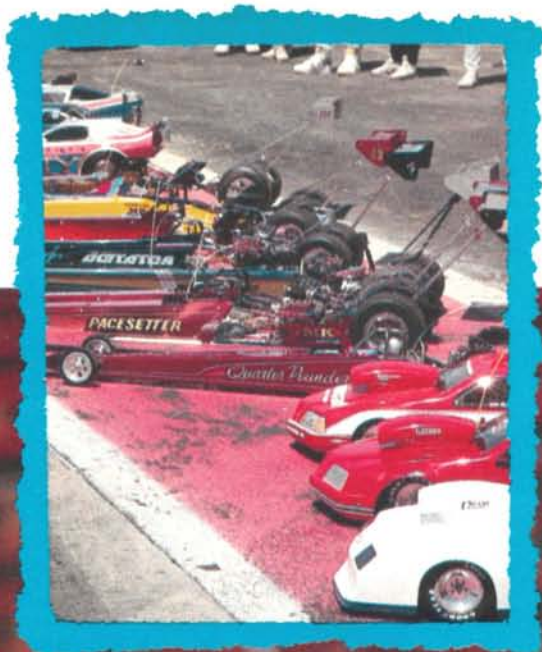
To be successful in drag racing, you not only need keen eyes and a lightning-quick response to the lights, but you also need a good working knowledge of your engine and how various conditions affect its performance. At any race, you'll see the crew chiefs and crews working vigorously to make the fine adjustments that are necessary to turn in the day's fastest time.

During the second weekend in June, it was business as usual at Atco Raceway in Atco, NJ, with a full two days of tire-smoking racing action; but this time, there was a difference. This was

by STEVE POND

Right: With a lot of room for paint, many of the entrants in the Concours contest had very impressive graphics on their cars.

Below: With all the fine detailing on this Pacesetter Funny Car, owned by Jim and Janet Parodi of Tech Toys in New York, it could easily be mistaken for a full-scale machine.



the site of the second annual MK/Pacesetter R/C Nationals, and all entrants ran R/C gas- and nitro-powered dragsters. In association with Atco Raceway and the SDRA (Scale Drag Racing Association), MK Engineering sponsored this event, which attracted the largest ever field of 1/4-scale dragsters, as well as nitro-powered 1/6-scale dragsters.

To accommodate all the entrants, there were 10 Classes for 1/4-scalers and two for 1/6-scale nitro-burners:

Quarter-Scale Classes: 50cc Stock Dragster; 50cc Nitro Dragster; 30cc Gas Dragster; 50cc Stock Funny Car; 50cc Nitro Funny Car; 30cc Gas Funny Car; 35cc Pro Stock; 35cc Alcohol Pro Stock; 50cc Gas Pro Stock; Experimental Pro Stock.

One-Sixth-Scale Classes: Top Fuel; Funny Car.

All from MK Engineering, each 1/6-scaler (funny cars and top fuelers) features a one-piece 4130 chrome/moly chassis. The front end has a breakaway design that will prevent damage during collisions, and harnessed to the chassis is a .60 (11cc) nitro-burning 2-stroke engine that's coupled to a centrifugal clutch. This clutch is connected to the gear-driven rear end by way of a solid drive shaft, and putting the power to the ground, there's a pair of soft-foam slicks mounted on a

pair of strong aluminum wheels. Because 1/6-scale racing is still relatively new, no particular type of fuel has yet proved itself consistently the "fastest," although most racers use a 50:50 nitro/methanol fuel mix. Some competitors made a few minor mods, but competition in the 1/6-scale classes was very close and very fast.

Owing to the larger number of classes and manufacturers in 1/4 scale, these races had a wider variety of configurations,

To be successful in drag racing, you need a good working knowledge of your engine and how various conditions affect its performance.

but the basic dimensions remained the same. In the Pro-Stock Classes, there were cars competing from WCM (a popular manufacturer of 1/4-scale oval-track cars) and New Era models (which specializes in drag-racing cars). The Pro-Stock cars feature a door-to-door frame that's also common in the full-scale class of Pro-Stock racing. Also in line with full-scale racing, the bodies resemble those produced by automobile



Frank Martorelli's 1/6-scale Funny Car took Concours for that class with his "Flash" Ford Tempo paint scheme.

manufacturers. For the most part, these cars run 35cc engines that are mounted transversely and connected to the rear end with a sprocket-and-chain drive. Although a few zealous racers had outfitted their pro stockers with 50cc engines, the 35s were the most popular. The WCM cars running 35cc Quadra engines featured an innovative two-speed transmission, as did a couple of the New Era cars. The WCM cars were out of their element running on a 330-foot track (1/4-scale 1/4 mile), because they were designed to run on a 165-foot track. All the pro-stock cars feature full suspension that's dampened by oil-filled shocks.

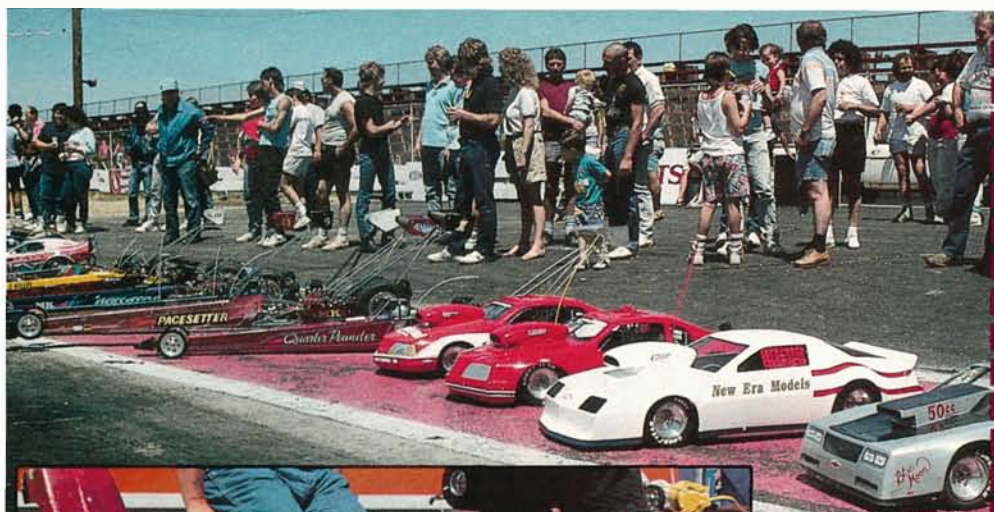
In the Funny-Car Class, most were of the old

Pacesetter design with shortened top-fuel-type narrow chassis and modified versions of one of Detroit's late-model muscle cars for bodies. These cars use a slightly larger 50cc gas-burning 2-stroke engine that drives either a chain system, or the newer gear-driven rear ends. The funny cars, as well as the aforementioned pro-stock cars, used either pneumatic rubber tires or the old, reliable foam tires.

The fastest 1/4-scale cars—the top-fuel cars—feature long, narrow, two-piece chassis covered by the sleek streamlined bodies for which these cars are famous. This class (which was the most popular) was dominated by the new MK Engineering top fueler that features a very powerful 54cc German-



The completely scratch-built, sharp-looking SRC entry was the hands-down winner of the 1/4-scale Best Engineering award.



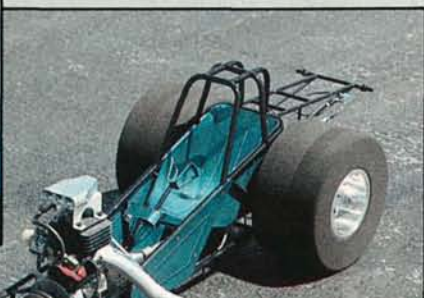
Above: During Concours, a number of spectators and racers lined up to see the detail work on the cars.

John Stecker is shown here starting his 1/6-scale Funny Car. These cars start with the same equipment that's used on gas-powered boats and airplanes.

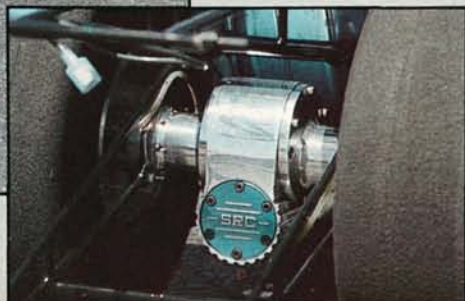
made Solo engine. With the crankshaft mounted in line with the chassis, the MK cars run the power through a two-stage clutch to a solid drive shaft and into a gear-driven rear that's solidly mounted in

the chassis. From there, the power runs out to two pneumatic or foam tires. Some of the racers showed up with the chain-driven version of the old Pacesetter cars that ran either a 35cc engine or the op-

Left: The engine of the SRC car was fitted with a blower-style hood scoop that just peeked through the body.



Left: For scale appearance, the SRC car had a complete dashboard, an aluminum tub for a drivers seat and a butterfly-type steering wheel.



Right: The most remarkable piece of machine work on the SRC car was the Strange-style quick-change rear end.

DURING THE MK / PACESETTER R/C NATIONALS, one of the many tuning decisions facing competitors was which tires they should run. Gas-powered dragsters are so new that drivers are still concentrating on tuning and driving the cars, and they have yet to pay attention to tire technology. In the past, racers borrowed the softer, foam-compound tires that are used on 1/10- and 1/12-scale cars. These tires are still used on shorter tracks where they can't go the full 330 feet, but they're too unstable at the higher speeds run on longer tracks. At very high speeds, foam tires "grow" (expand in circumference) slightly; the down side is that, during tire warm-up and even through regular use, foam tires wear quickly, and this has a very detrimental effect on the car's acceleration. For those who choose to run foam tires, there are a number of traction compounds for 1/10- and 1/12-scale racing that will improve traction, or you can whip up your own brew.

Another tire used in drag racing is the pneumatic rubber type, which is borrowed from racing go-carts. This tire uses a soft, sticky rubber compound that's suitable for drag racing, but (there's always a "but"!) its diameter presents a minor problem for these dragsters, because these cars don't yet have changeable gear ratios in the rear end. When inflated, the tire's diameter is slightly larger, and this allows good contact with the ground, but it also makes them a little *too* large, and this hampers acceleration. Further, because they're sealed with an air valve, they don't "grow" at top speed.

The other side of the rubber story is the non-inflated tire. Instead of a valve, there's simply a hole left in the rim, and this allows the tire to "grow" on the top end, but contact at the starting line isn't as good. This may sound a little critical, as the difference in times (with all other variables remaining the same) isn't more than 3/10 or 4/10 of a second, but because drag racing is a game of inches, this could make a difference.

For radio-control dragsters, there should be some lighter, stickier, faster tires on the horizon. Until then, racers are trying all different kinds of tricks with the tires to go that 1/10 second faster.



Taking top honors in the 1/4-scale Concours was Frank DeSimone of New Era with this Glidden Thunderbird replica. Note the excellent detail work in the grill and headlights.



Mike Kopchick's 1/6-scale Funny Car was one of the fastest of the day, but he couldn't beat Ed Mandeville's time for the win.



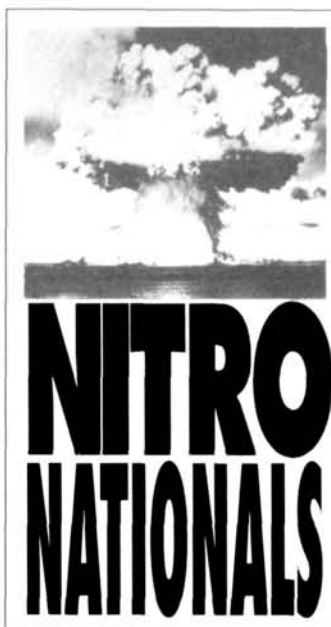
Mike Kopchick and Mike Welsh are seen here preparing MK's 1/4-scale Top Fueler, which eventually took top honors in the class.

tional 50cc Quadra engine.

Atco Raceway is owned by Bob Van Sciver, and he's an avid 1/4-scale-racing enthusiast. This track has been the site of many full-scale races with some of the world's fastest, most powerful cars, and this makes it an ideal setting for this event. Van Sciver and his crew set up the Chrondek timing system (the system used for full-scale races) to accommodate the 1/4-scale and 1/6-scale cars. The finish lights and the speed traps had to be moved to 220 feet for the 1/6-scale cars and 330 feet for the 1/4-scalers. This allowed drivers to check their reaction time to the lights, their ET for the run, and their top speed at the end of the track. The use of this system is just one of the many elements that made this a most enjoyable drag-racing event for all competitors.

The racing program began on Saturday with a complete day of practicing for all entrants. This gave everyone an opportunity to dial-in their cars to suit the track's conditions. Owing to the preceding day's rain and the fact that the full-scale cars have deposited pounds of rubber in the staging area, the track was very slippery. At the close of practice on Saturday, the crew went to work on the track to make it as good as possible for the next day's schedule. Their efforts certainly paid off; when racers arrived for qualifying

From left to right: Frank DeSimone with his Concours-winning New Era T-Bird; Ed Rink representing the SRC team with the 1/4-scale Best Engineering winner; Elvir "Elmo" Prorocovic with the 1/6-scale Best Engineering winner; and Frank Martorelli with the 1/6-scale Concours winner.



early on Sunday, they ran considerably faster times than those run on the previous day.

One-sixth-scale top fuelers qualifying was headed by Mike Kopchick with a blistering time of 3.66 seconds. Kopchick and Mike Welsh (3.90) were the only two who managed to break the 4-second mark. The rest of the five-car field ran in the low to mid 4-second range. The 1/6-scale Funny-Car Class was headed by Ed Man-deville with a low ET of 3.85 seconds. Joe Algino just squeaked under the 4-second mark with his best qualifying time of 3.97 seconds, and the rest turned in low 4-second to mid 5-second passes to fill out the eight-car field.



Bob Shifano, racing the RS Refinishing 1/6-scale Funny Car, prepares for qualifying.

In the 1/4-Scale Classes, the highlight came when Mike Kopchick led the nine-car field of 50cc stock dragsters with a 5.05-second pass at 65.1mph. Taking top honors in the 50cc Stock Funny Car Class was Ed Rink, driving the SRC entry, with the fast time of 6.27 seconds in the four-car class. This class put on a spectacular display, because some lost control of their cars and went right into a puddle of rain water that



The only soldier to brave the nitro fuel in the 50cc Funny Car class was Anthony Lombardo, with the Night Stalker.



Runner-up in the 50cc Stock Dragster class was the Wizard, driven by Mike Horne.

NITRO NATIONALS WINNERS

Driver

E.T.

Car

1/6-Scale Top Fuel

Winner: Mike Kopchick 3.74 MK Top Fuel Dragster
 Runner-up: Mike Welsh 3.88 MK Top Fuel Dragster

1/6-Scale Funny Car

Winner: Ed Mandeville 3.56 MK Fuel Funny Car
 Runner-up: Elvir Prorokovic 4.40 MK Fuel Funny Car

35cc Pro Stock

Winner: Frank DeSimone Jr. 6.33 New Era Pro Stock
 Runner-up: Tony Volpe 6.92 New Era Pro Stock

35cc Alcohol Pro Stock

Winner: Dave Schwartz Jr. Bye run New Era Pro Stock

50cc Gas Pro Stock

Winner: Mike Desanno 5.99 New Era Pro Stock
 Runner-up: Dino Desanno 7.68 New Era Pro Stock

Experimental Pro Stock

Dave Schwartz Bye run New Era Pro Stock (70cc)

30cc Gas Funny Car

Winner: Chick Colwell 7.44 Pacesetter Eliminator
 Runner-up: Todd Malvezzi 9.61 Pacesetter Eliminator

50cc Nitro Funny Car

Winner: Anthony Lombardo 6.72 Pacesetter Eliminator

50cc Stock Funny Car

Winner: Ken Fusco 6.28 Pacesetter Eliminator
 Runner-up: Rainbow Hobbies 6.61 Pacesetter Eliminator

30cc Gas Dragster

Winner: Chuck Carter 10.98 Pacesetter Vaporizer
 Runner-up: Phil Berger N/A Performance Drag Products Cobra

50cc Nitro Dragster

Winner: Mike Ciofalo 6.22 MK/Pacesetter MK Fueler
 Runner-up: George Denault 8.94 MK/Pacesetter MK Fueler

50cc Stock Dragster

Winner: Mike Kopchick 5.04 MK/Pacesetter MK Fueler
 Runner-up: Mike Horne 5.25 MK/Pacesetter MK Fueler

slow winner. Team-mate Mike Welsh also ran a bye at 3.99 seconds when, owing to mechanical problems, John Tabor failed to stage. The next match paired Charles Neal and Mike Jacobs, who drove the sharp-looking Tin Man MK Engineering top fueler. Neal got the holeshot when he caught Jacobs sleeping on the line, and he took the win with a time of 3.82. Neal and Kopchick took the next round to pair up for the final, only to see Neal break on the line. This gave Kopchick the win with a bye run for the final in 1/6-Scale Top Fuel.

In the 1/6-scale Funny Car eliminations, the field was whittled down to four: Ed Mandeville was paired with Elvir (Elmo) Prorokovic, and Mike Kopchick with Frank Martorelli. In the semifinal round, Ed Mandeville took a decisive win with a time of 3.93 to Elmo's

was at the side of the track. The cars came out unscathed, if just a little wet, and they finished the program, but their misfortune brought "oohs" and "aahs" from the spectators. The four-car Pro-Stock Class was the last to qualify, with Frank DeSimone's new Era stocker taking the best time of 6.14 seconds to lead the field.

As the afternoon sun beat down on the track and the competitors, they became uncomfortable and the track became even more sticky for the start of the eliminations that would determine who would go home with this year's bragging rights.

The 1/6-scale Top-Fuel eliminations started with Mike Kopchick taking a bye run (solo) to the semifinal with a 4.03 first pass, which turned out to be the

troubled 5.27. Mike Kopchick (owner of MK Engineering) won with a 4.34, so the two friendly MK Engineering rivals (Mandeville works with Kopchick) lined up for the final.

As the lights flashed for the into an early lead, but, making Mandeville was able to turn Kopchick for the win with a the event's fastest time for a

Despite their smaller engines cars put on an impressive show only hundredths of a second slower than those of the 50cc cars. With a winning time of 6.33 seconds, Frank DeSimone Jr. beat Tony Volpe in the final round. In the 50cc Gas Pro-Stock Class, Mike Dessano took

rt, Kopchick jumped he best horsepower, he juice to overtake e of 3.56 seconds— 5-scale car.

the 35cc Pro-Stock of power with times ver than those of the

Despite their smaller engines, the 35cc Pro-Stock cars put on an impressive show of power with times only hundredths of a second slower than those of the 50cc cars.

home the trophy when he beat Dino Desanno to the line with an ET of 5.99 over Dino's 7.68.

The 35cc Alcohol Pro-Stock Class turned out to be less popular: There were only two cars to qualify, and one wasn't able to make the final show, so Dave Schwartz Jr. took the win with a bye run. The "run-whatcha-brung" class of Experimental Pro Stock is potentially very exiting, but with Frank DeSimone and Tom Libbey unable to qualify, Dave Schwartz coasted to an easy win with a bye run.

Chick Colwell won in the 30cc Gas Funny Car Class, which ended as a two-car show. Anthony Lombardi coasted to an easy win in the 50cc Nitro Funny Car Class, because he was the only one brave enough to tame a nitro-fueled car. In the four-entrant 50cc Stock Funny Car Class, Kenny Fusco took 1st with an ET of 6.28 seconds over the Rainbow Hobbies entry.

A pair of easy wins by Chuck Carter over Phil Berger in the 30cc Gas Dragster and Mike Ciofalo over George Denault in the 50cc Nitro Dragster Class set the stage for the final in the 50cc Stock Dragster Class, which had the event's fastest times. After making some adjustments to cope with changes in the weather, the competitors headed for the line to see who would be victorious at the checkered flag.

The first match paired Jerry Tanner with Ron Albanese, both running MK's new 1/4-scale dragsters. Jerry devastated the field and struck fear into the competition with the fastest time of the event, turning in an unbeatable 4.87-second run! He advanced to the next round with Vinny Aversa, who won his race against Ed Kelly by running a 5.31 to Kelly's 6.17. Mike Horne (who beat track owner Bob Van Sciver) and Mike Kopchick (who got a bye run for his fast qualifying time) also advanced to the next round. By beating Phil Longo, Mike Rigas was the last to slide into the second round.

The semifinals paired Kopchick with

another bye run while Mike Horne pulled a surprise time of 5.31 over the speedy Jerry Tanner. This set the stage for the final with Kopchick, who had been running consistently well all day and would be tough to beat. The tension was obvious as both competitors staged for the final in 1/4-Scale Top Gas (no staging games here—strictly business!). Both fuelers got the stage light, which had them waiting for the yellow flash just before the green. When the bright yellow tree light came on, a quick look revealed racers who were mashing the throttle for the green that was to follow. Both got off to a fast, clean start and were running head-to-head when Kopchick pulled ahead by a nose for the win and the end of this year's 1/4-scale Drag Nationals.

At the close of the event, many of the battle-weary racers received trophies for their efforts, and the top finishers were awarded cash, too. For some racers, cash was a welcome addition to a trophy, as it helped to offset their expenses.

While each competitor deserves credit for his or her accomplishments, and the organizers should be applauded for running the show so smoothly, there's more praise to be given: Each of the racers was more than willing to lend a hand when the going got tough, and that's great to see in a sport that's so new. While racers weren't ready to relinquish their most treasured speed secrets, e.g., their blend of fuel, or the minor clutch mods they made to chop tenths of a second off their ET, all were more than willing to help other entrants to tune or repair their cars.

The event's sponsor, MK Engineering was just as helpful. Mike Kopchick and the rest of the crew were always ready to help racers with cars, whether tuning or minor parts replacement. These guys are in it for the long run—and it showed!

With more manufacturers recognizing the potential of 1/4-scale drag racing and demonstrating their support (as we've seen), this segment of our sport will surely get even better. ■

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MODEL 200-3 SET CONTAINS:

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MODEL 350-3 SET CONTAINS:

350 medium tip air-brush with attachable 3/4 oz. (22 cc) jar, 6 ft. (1.83 meters) vinyl air-hose, 2 oz. (60 cc) jar with cover, 1/4 oz. (7 cc) color cup, propel regulator, propel can, wrench for head and instruction booklet. **Only \$46**



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T R A N S M I T T E R

by N. KING

TRANSFORMATION

SUPPOSE I TOLD you that I can make you a better driver for \$2.18, plus tax. It might *sound* impossible, but I think I can do just that!

While racing on banked ovals (pavement or carpet), I noticed that very little steering was required. I first dialed-out all the steering on my transmitter, then I adjusted the mechanical linkage to obtain minimum steering. I still had too much!

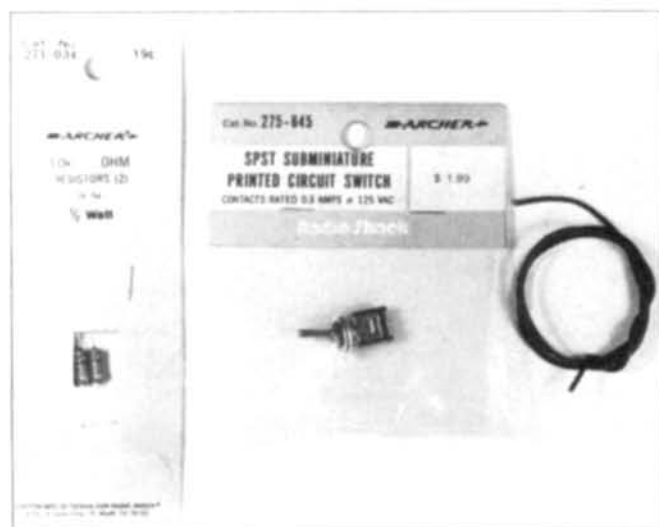
The turn marshalls threatened to strike because my car was all over the place. What could I do next? I modified my transmitter. This is very easy to do, and even someone with no knowledge of electronics should be able to do it.

I use two radios: a KO Propo* and an Airtronics*, and of these, the Airtronics allows you to dial-out more steering. (I hardly ever need less than this transmitter

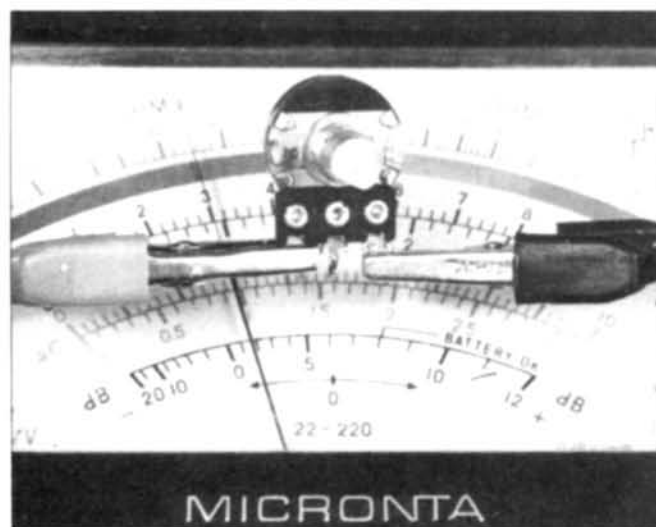
provides.) On the other hand, the KO was in great need of assistance, and that's why I chose it to demonstrate this modification. Mine is an EX-8, which is identical to the EX-5 on the inside, but has a nifty boat steering wheel.

First, visit your local Radio Shack store to pick up the following:

- SPST sub-miniature switch (Part No. 275-645; \$1.99)



1. The \$2.18 worth of parts you'll need for the project.



2. Measure the value of the factory potentiometer if it isn't printed on the front. You'll have to do this when modifying radios of other brands to buy the proper resistor.

- 10K-ohm resistor (Part No. 271-034; 19 cents)
- 1 inch of 20- or 22-gauge wire (if you don't already have some)

Start by disassembling the transmitter. Unscrew the antenna, remove the batteries, the crystal, and eight Phillips-head screws from the back and two from the front. Use a No. 1 Phillips screwdriver (the one that's always too small for anything else you need!). Be sure to look away while you remove the back cover, or you might get hit in the eye by something. (What *is* all that junk in there, anyway?)

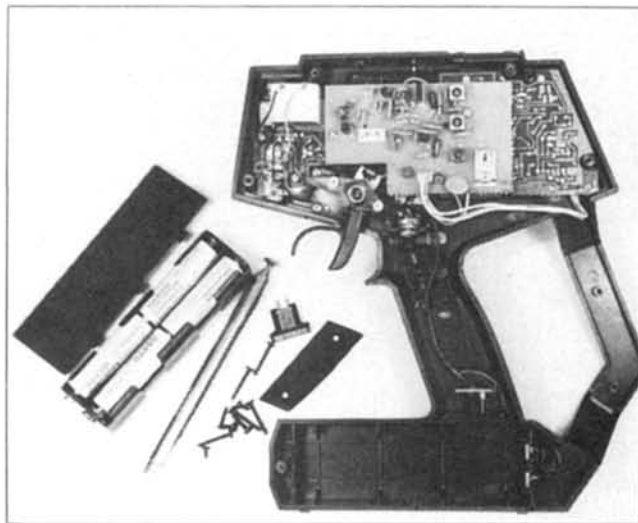
Next, along the casing, find a convenient space for the switch. Mark the spot, and drill a 1/4-inch hole, but be very careful not to drill into the electronics!

Using a low-power iron (20 or 30 watt) or a soldering gun, un-solder the wire from the center tab on the dual-rate potentiometer (or "pot"). It's the dial that gives you more or less steering. Solder a piece of wire and one end of the resistor to this tab. To the other end of the resistor, connect the wire you un-soldered from the pot, along with another piece of wire. You should now have two pieces of wire that you can solder to the switch, and you then install the switch in the trans-

mitter. Make sure that you have no short circuits! Use electrical tape to ensure this.

Put the transmitter back together and you've finished—easy, huh?! Turn on your radio system to see which way the switch should be flipped to take effect. Mark the transmitter so you'll know which way the switch should go for less steering.

The procedure I've just outlined will work on any transmitter with dual-rate steering, but the value of the resistor might have to be different. A greater value—like 22K ohms—will give you even less travel; a smaller value—like 5K ohms—will give you more. You'll just have to experiment to see how much you need. As a good starting point, use the value of the factory pot, and its value is usually printed on it. If not, measure across the outside tabs with an ohmmeter. You'll still use the factory pot to finely tune your steering after you've decided in



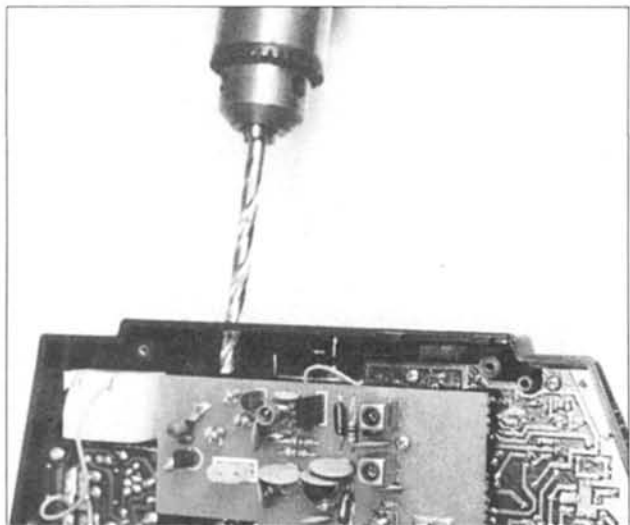
3. The disassembled KO Propo EX-8. To avoid damage while handling, be sure to remove the crystal, batteries and antenna.

which position the switch should be.

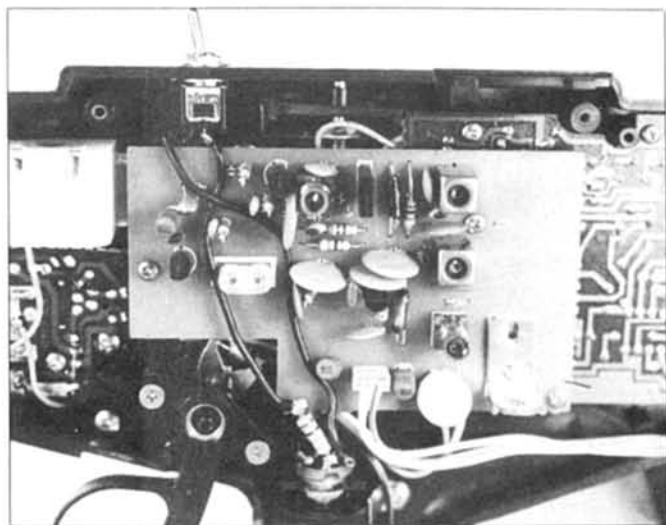
With this increased control, your car will be less "squirrely," and you'll be driving like a pro. Next month, I'll tell you how to build a satellite "uplink" for your system!

**Here are the addresses of the companies mentioned in this article:*

KO Propo; distributed by Global Hobby Distributors, 10725 Ellis Ave., Fountain Valley, CA 92728.
Airtronics, Inc., 11 Autry, Irvine, CA 92718. ■



4. Drill a 1/4-inch hole in a location that's convenient for placement of the switch. Be very careful not to drill into the electronics!



5. The completed modification. Make sure there are no short circuits.

SCOPING OUT

by JOHN RIST

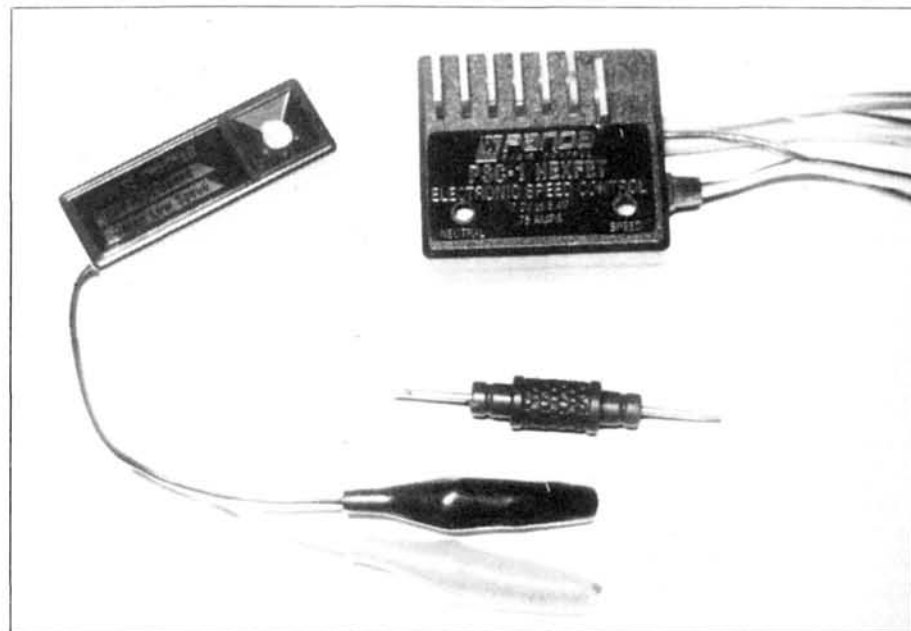
Panda enters the speed-control market with the PSC-1

AS I stood at the racetrack watching a group of young men practicing for a race, a costly and potentially dangerous accident occurred. One of the modelers picked up his car and plugged in his *hot* 7-cell racing battery. The modified motor in his car jumped to life and the back wheels started to spin. He dropped his car onto the track and reached for his transmitter, which was turned off and lying on a bench beside him. He turned on the transmitter, but the car didn't respond; instead, it jumped the track and ran into the street in front of the hobby shop. Narrowly missing passing cars, the car made a big circle in the street until it smashed into the curb. This stopped it, and its owner disconnected the battery. The car suffered major damage, but, luckily, no one was hurt.

There were three causes of this accident: First, the owner had picked up the wrong transmitter from the bench (all Futaba Junior transmitters look alike!), so he was trying to control his car with his friend's radio. Second, the car was turned on before he turned on the transmitter. Third, he let the car go before he had control of it. This happened because the speed control was a mechanical type, which is servo-driven. When the transmitter is turned off, the servo stops and stays put, so when the car was turned on without receiving a radio signal, the throttle was stuck in the "on" position.

In contrast, most FET electronic speed controllers tend to shut off when they lose a signal. Electronic speed controllers have many advantages, including greater safety. Panda*, a new supplier of speed controllers, markets two forward-only-with-brake controllers: the PSC-1 and the PSC-2. The Panda PSC-1 is the cheaper of the two and is the topic of this month's "Scoping Out." The Panda PSC-2 will be reviewed in a future issue.

The nicely packaged Panda PSC-1 comes in two parts: the speed controller proper and a pulse-check unit for verify-



ing the full-throttle setting. The package also contains a screwdriver, an instruction booklet and a corrections sheet. I compared the changes in the correction sheet with the original manual and found that the sheet did clarify some of the instructions. I recommend that you read both before you try to install and run the Panda PSC-1.

I'm puzzled why Panda made the pulse checker a separate unit. The prime difficulty with this arrangement is that you must disconnect the motor before you can use the pulse checker. Panda does provide a matching pair of motor leads to mate with the bullet-style motor connectors provided. I like to hard-wire my motor (solder all connections; no connectors), but Panda's instructions clearly say that the warranty is void if you remove or replace the connectors. I'll comment further on the connector/warranty issue later.

The Panda PSC-1 features fully proportional forward control, dynamic shunt braking, six FETs for forward and one FET for brake.

To review this speed controller, we'll go to my lab, which consists of an oscil-

loscope, a digital voltmeter, a resistor load bank and a 6V, 30-amp lab supply. The oscilloscope is used to monitor the controller's output to ensure that the controller is fully on. The digital voltmeter is used to take the voltage-drop readings and to verify the current-meter reading. The resistor load bank is a bank of 40, 12-ohm, 5-watt power resistors. These resistors can be switched on and off one at a time to vary the load from .6 to 20 amps. In series with the resistors is a 25-amp Simpson current meter and a 1-percent .01-ohm resistor. By measuring the voltage drop across this resistor, the current meter reading can be double-checked. Of course, the lab power supply supplies the test current.

With all racing-style speed controllers that come with battery and motor connectors, I run two tests. First, I measure the voltage drop from battery connector to motor connector, including wire. Then I use needle probes to measure the voltage drop at the 2-inch point on the wires. I chose this length of wire because it's the minimum length that still permits a controller to be "direct-wired" into a car; keep

(Continued on page 70)

SCOPING OUT

(Continued from page 66)

in mind, however, that Panda voids the warranty if you remove or replace the connectors.

This moderately priced controller has more of a voltage drop than some other 7-FET controllers I've tested. The measured voltage drop for the connector-to-connector test at 12 amps was .34V, and this yields a resistance of .028 ohm. The measurement at the 2-inch point produced a drop of 12 amps at .16V for a resistance of .013 ohm. This comes very close to the manufacturer's specified value of .015 ohm. As always in a forward-only speed controller, the stock connectors and the excess wire account for half the voltage loss.

A word of praise for Panda: This is the first time that the 2-inch-wire test results have been the same or less than the advertised resistance of a controller. Panda actually published a resistance number that includes the resistance of the printed-circuit board, FETs and wire, not just the resistance of the FETs.

The next step in the lab test is the "let-it-cook" test. I run the speed controller for 15 minutes at full throttle and then at half throttle for another 15 minutes. I deliberately ran the controller without a heat sink or cooling air, and the PSC-1 became hot. If you plan to run this controller with a 7-cell battery pack, or if you're geared for short, 4-minute races, I recommend that you use a heat sink and always make sure that plenty of cooling air can reach the FETs.

The dead-short test was next. I have a short piece of monster wire with two alligator clips that I clip across the controller's output. The 25-amp ammeter in my test setup always pegs during this test, so I know that the short produces more than 25 amps. I'm trying to simulate the conditions of a car stuck under a rail, or one with a shorted-out motor. I only leave the short on for a few seconds, because that's what you'd do if your car wouldn't go: You'd shut it down quickly

PANDA

PSC-1

DIMENSIONS:

Overall Length	1.61 inches
Width	1.5 inches
Height	.62 inch
Weight	1.5 ounces
Access to Controls	Fair
Ease of Adjustment	Good
Warranty	30 days

ELECTRICAL:

(Manufacturer's Specs)

Max Voltage	8.4 volts
Min Voltage	6.4 volts
Max Current Forward	288 amps
Continuous Current Forward	75 amps
Resistance	.015 ohm
Sug. Retail Price	\$99.98

TEST PARAMETERS:

Voltage	6 volts
Current	12 amps
Voltage Drop with Connectors	.34 volt
Resistance with Connectors	.028 ohm
Voltage Drop, 2-inch wire	.16 volt
Resistance, 2-inch wire	.0133 ohm

COMMENTS:

I like the solid construction and ease of installation. The PSC-1 has a nice feel with respectable lap and run times. It's a little on the heavy side, but it will fit most 1/10-scale cars and trucks well. Resistance levels are at or below the manufacturer's claims. The pulse checker would have been more conveniently located in the controller, instead of being a separate unit. On the down side, the colors of the wires are confusing.

and find out what has gone wrong. I repeated the short test two or three times and the Panda PSC-1 did survive. It's tough enough to stand a lot of abuse; when things aren't working properly, however, use a little common sense. A little care will greatly extend the life of any speed controller.

Finally, I took the PSC-1 apart to inspect its innards. The printed-circuit board is high-grade fiberglass and the solder joints all looked good. The Panda PSC-1 is on the large side for a racing controller, but this means there's lots of room for parts and wires. It looks very good inside.

Now for the fun part of my job—the track test! I installed the Panda PSC-1 in my trusty Turbo Ultima. The installation was straightforward; if you follow the in-

struction book and the correction sheet, you shouldn't have any problems. I'm not too excited about the external pulse checker, but it did work well, and the change from green (which means the controller is partially on) to red (which indicates full throttle) is very precise. The supplied screwdriver is very effective, and this isn't always true of "free" screwdrivers. I arrived at the track with several charged 6-cell packs and a Twister stock motor.

The Panda PSC-1 has a nice feel, and lap times and run times were what I expected. The controller did get quite warm (which I expected, following the lab test). I have my car geared for a 4.5-minute dump, and this really puts the juice through a controller. The braking action also behaved as expected. A properly set-up car using this controller should be competitive in the stock class; it's definitely hotter than a mechanical-style controller or an FET controller with reverse.

I like the Panda PSC-1's solid construction and its easy installation. It's a little large, but it should fit nicely into any 1/10-scale car or truck. Any FET controller that works is better than a mechanical speed controller. The Panda PSC-1 did work well and, at a suggested retail of price of \$99.98, it's a good choice, especially if you find one at a discount.

I didn't like the pulse checker being a separate unit, and that Panda voids the warranty if you replace a connector. In Panda's defense, the primary causes of the destruction of FET controllers are reversing connections to the battery, or connecting the motor leads to it. This presents a dilemma, however, because by replacing or eliminating the connectors, you can double the performance of this controller. Since Panda's warranty period is only 30 days, it's reasonable to run the PSC-1 for 30 days in its stock condition; then, when the warranty period is over, you can replace the stock connectors with high-qual-

(Continued on page 114)



SLIP-STREAM

TRACK REPORT

Fine Design Manufacturing, however, you have to admit that this company grabbed the raw stuff of straight-line speed and did more than its fair share to propel it down the scale quarter mile at a rate that was previously unheard of.*

Nearly two years ago, Fine

Design

devel-

oped one of the

first dragsters. R/C

STREAMLINER RAIL

by BILL O'BRIEN

NO SINGLE PERSON or company

can possibly take credit

for starting R/C scale

drag racing. If you take

into account all the time, effort

and enthusiasm invested in it by



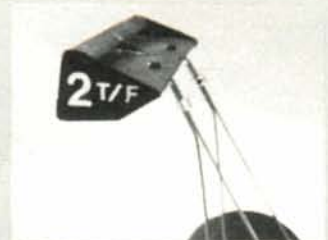
No ball differential here! Fine Design believes that the best forward motion comes from a directly driven axle.

A M D R E A M

Car Action reviewed the machine, and it flew at the unprecedented speed of 56mph. At the summer Nationals two years later, a Fine Design fuel rail broke the 2-second barrier and exceeded 74mph. (Chris Fine claims the rail hit 75mph during a practice run, but it isn't official.) This might not impress you until you realize that I'm talking about a 1/10-scale electric dragster. There's no gas, no methanol, no nitrous oxide—just straight, potent, Ni-Cd lightning!

My first experience with Fine Design came just after that original *Car Action* review. I bought a FireFox fuel dragster and, out of the box, with my electrics, I was running mid 3-second times down the scale quarter mile. I recently wrapped my greedy paws around one of Fine Design's latest offerings: The Streamliner Rail is more precocious than its sibling ever was!

THE KIT: The Streamliner is an advanced version of that old FireFox (in the same way a Porsche is an advanced version of that little red wagon you owned as a kid!). Inside the box are a rolling chassis and body that dust the scales at a measly 1.06 pounds. Granted, no electrical parts are in-

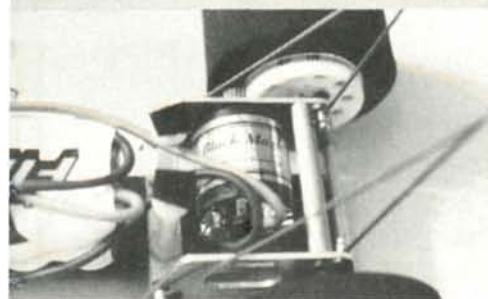


The rear wing is the only difficult part of the assembly. You literally have to make it yourself out of a thin graphite panel that comes with the kit. Cover both sides with masking tape to prevent splintering, and you can cut the graphite with Lexan scissors.

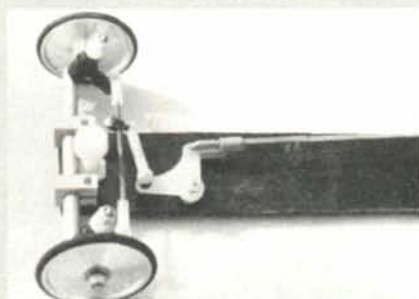
two thin graphite strips. Hanging off the front of that wafer are two 1/8-inch-wide aluminum wheels trimmed in rubber O-ring tires. At the back are monster meats: Two 2x3-inch foam donuts are wrapped around 1.875-inch-diameter aluminum wheels.

The front steering blocks are glass-filled nylon, and they're mounted in typical on-road fashion over kingpins, while short-throw, light springs provide suspension travel. Steering is done through a bellcrank routed to a mid-mounted servo of your choice.

Back where the rubber meets the road, you'll find an aluminum motor pod, but



The Streamliner's engine pod is comparatively large, giving you easy access to your motor.



The chassis might be high-tech, but the front end is strictly traditional. The only weak link in the system might be the steering bellcrank; if you don't keep your eye on it, it will loosen slightly and add some slop to the steering.

cluded, but keeping trim isn't difficult.

The long, single-plane chassis plate is really a foam core sandwiched between

you won't find a differential. Fine Design subscribes to the direct-drive theory of

(Continued on page 128)

FINE DESIGN

STREAMLINER RAIL

Type Fuel dragster
Scale 1/10
Sug. Retail Price \$249

DIMENSIONS:

Overall Length 29.5 inches
Wheelbase 24 inches
Front Track 4.25 inches
Rear Track 5.25 inches

WEIGHT:

Gross (w/bat.) 2.65 pounds

BODY:

Type Rail
Material Lexan

CHASSIS:

Type Single plane
Material Graphite

DRIVE TRAIN:

Primary Pinion/spur
Transmission Direct drive
Differential None
Bearings Ball bearings

SUSPENSION:

Front: Type Coil spring
Dampening None
Rear: Type None

WHEELS:

Front: Type Aluminum
Dimensions (DxW) ... 1x.125 inches
Rear: Type Aluminum
Dimensions (DxW) 1.875x2 inches

TIRES:

Front Rubber O-ring
Rear Foam slicks

ELECTRICS:

Motor 05/540 (not included)
Battery Sub C or smaller cells (not included)
Speed Controller Electronic (not included)

OPTIONS AS TESTED:

Futaba Magnum Junior transmitter and S132H servo; Novak receiver; PDI drag electronic speed control; Black Magic 13-turn motor; 10-cell, 3/4 sub-C SCR battery pack; 48-pitch gears.

COMMENTS:

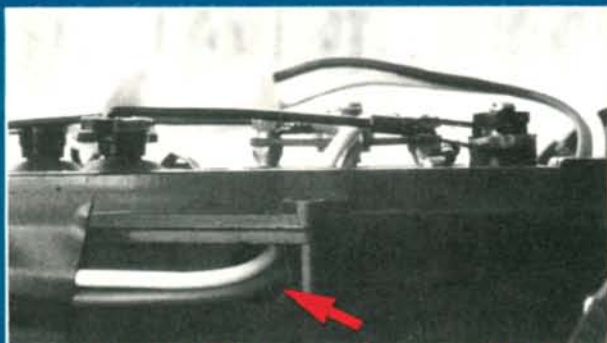
The car goes from box to track quickly, because it comes as a rolling chassis. All you have to do is assemble the wing, detail the body and install the electrics. After some initial radio trouble, the Fine Design Streamliner didn't really need any help to get down the track. While the 2.57-second runs were respectable, it will take a just little tuning to get the rail into competitive form. This won't be hard at all, because Fine Design includes plenty of instructions to help you dial-in this dragster.

Setting up the Crusher for off-roading

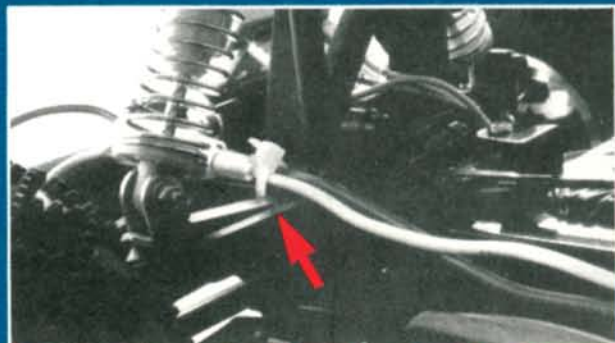
BUDGET RACER

by DICK BRINTON

A LOT OF BLACKFOOT Monster trucks are merrily tearing up race courses out there in R/C country, so when Executive Editor Chris Chianelli and I discussed a new "Budget Racer" series, we decided to see which other monster trucks could be made into good off-road racers. The first part of this series will deal with the conversion of the Royal* Crusher to an off-road racer. After that, we'll take on Tamiya's* Monster Beetle and work



Routing the motor leads through new holes prevents binding and chafing. Notice the Z-bends in the rods between servo and steering arms; the bends can cause binding.



Tying motor wires to upper A-arm keeps them clear of suspension.



out the mods necessary to put it consistently into the winners' circle.

When the Royal people designed the Crusher, they certainly weren't thinking of off-road racing. They built a scaled-down car crusher that worked just like the full-size ones, which weigh 10,000 to 12,000 pounds; they turn on a dime and flatten cars like a safe dropped on a tomato can. Remember that the Crusher wasn't designed for off-road racing, and that the conversion suggestions aren't criticisms of the kit.

There are, however, some areas that Royal needs to address. For instance: I had to re-groove the bevel gears so they would slide far enough on the shaft to keep them from binding when the transmission was assembled. Royal has had problems with the transmission-case fit, but they've included instructions about how to fix it. Mine was fine, except for the bevel gears I mentioned.

Royal's kit includes metal bushings, and these are much better than the plastic pieces found in some kits. If you use bearings (anyone racing anything should use bearings), you'll have to clean the paint off the axle shafts with emery cloth; if you don't, the bearings won't slip on. I used Aerotrend's* bearings, which I've used in the past, and they're the best I've seen. They fit well without undue slop, and they last a long time.

When mounting the motor, I used four shims toward the front and two toward the rear (the opposite of the instructions). Since the builder can't see the gear mesh, it's easy to get it too tight, and performance will suffer. The pinion has a

long, non-standard shank, but Royal shipped me four new ones: three 13-tooth (!!) and one 15-tooth. The point is, there are other pinions available.

A word of caution about steps one through four on page eight: *Do not perform these steps without safety glasses!* If something slips when you're trying to assemble these servo-savers, the pieces can come off with enough velocity to hurt. Also, on page eight, step five, I used a vise to push the ball joint into the connector. It's a lot easier

than trying to force it by hand or with pliers.

There's a problem with the space allotted for the servos: If you're using standard-size servos, you'll have to chop off part of the mounting lugs to get them to fit, which may make the servo useless if used in other vehicles.

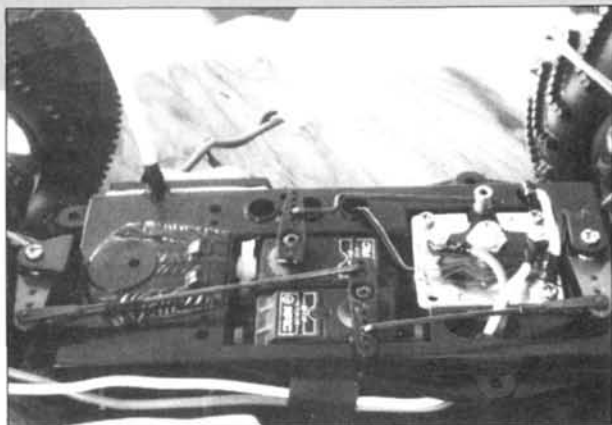
Unfortunately, the rear upper A-arms are longer than the lower ones, so the rear tires develop positive camber (they tilt out at the top). This may not be a problem in car crushing, but in off-road racing, we need all the rear tire surface on the ground for good acceleration and handling. Maybe Royal can come up with an off-road racing conversion that would correct this problem.

I also modified the routing of the motor leads from the speed controller, because when I followed the directions, the wires would drag on the edge of the small hole provided. This causes the servo to work harder, frays the wires and, in general, messes up the action of the speed controller. I re-drilled the hole to over twice the size, then drilled another hole in the side of the chassis and ran the motor wires on the outside of the chassis. It's much easier this way, there's no drag, and the motor wires don't interfere with the steering.

The rods and clevises that connect the servo arms to the steering arms and to the speed controller aren't very well designed. When they're installed as directed in the construction manual, they angle and tend to bind the action. I twisted the speed controller rod 90 degrees, and it worked perfectly. The only way to get the oth-

(Continued on page 79)

BUDGET RACER



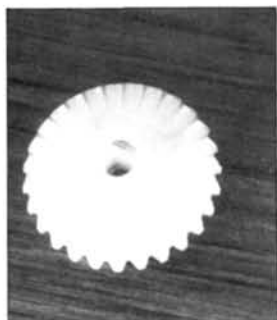
The speed-controller arm is twisted 90 degrees so the action is straight. Compare with stock arm. Note that the top hole has been enlarged for motor leads.

ers to work freely is to use 4-40 rods and a ball-and-socket connector. That's one of the mods we'll be making. Naturally, I broke one of the steel spring clevises while taking it off one time too many. My experience with R/C airplanes is that steel clevises break at just the wrong time. (Is there any right time?)

The stock Crusher tires and wheels are too large and heavy for off-road racing (though they're dandy for squashing cars), so after correcting the aforementioned, I installed a set of Advance Engineering* aluminum wheels (U10B12R), using its adapters for the Crusher (R108FRH) and mounted them with Killian's No. 2205 front tires and No. 2208 rears. These are

vance may have corrected this problem by the time you read this, but be sure to check it when you purchase this setup.

Finally, it was off to the Sacramento MiniWheels off-road track. Whenever you take a truck that was intended for car crushing and try to make it into an off-road contender, you can expect some "unusual" problems. They showed up in a hurry. For example: 4WS is fine for maneuverability, but it's not the hot setup for fast laps on an off-road track. Even the full-size car crushers don't use full-time 4WS. The rear wheels are usually steered independently by a separate control in the cab. Since the original Crusher design allows lots of front-wheel turning when



Far left: The darkened area shows where the inset in the gear was relieved for fit.

Left: Spacers produced the additional clearance required for prototype adapter to work at rear wheels. Production models won't need spacer. (See text.)

absolutely beautiful wheels, but the adapters need a dose of quality control. From largest to smallest, the shank of the four adapters varied 1/16 inch in diameter, which meant I had to open up the center hole in one of the wheels to get the adapter to fit. There was also one adapter drilled off center. In addition, the adapters were evidently designed from measurements made on the front wheels, since they were 1/8 inch too short for the rears, and they interfered with the steering knuckles. I shimmed them outward with washers between the hubs and the adapters. Ad-

using the Advance Engineering wheels, I found I didn't need, or want, the rear wheels helping at all.

I'm here to tell you that 4WS at high speeds tends to produce a "wheels up" position—kind of like a turtle on its back. It's the first time I've ever seen a car do a 1 1/2 with a full twist in the pike position. Style points were good, but the landing was terrible. The Crusher is tough, though, and it never missed a beat.

The stock shock units are the friction type, which work well for car crushing,

(Continued on page 160)

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VISA



PROJECT PUMPKIN

(Continued from page 19)

mounting procedure is a little different from that of the stock units; angle brackets are attached *directly* to the chassis points before you add the new units. All the necessary instructions and hardware are included in the kit.

Now that the four corners are taken care of, a few other minor modifications are needed to bring the chassis up to snuff. Heavy-duty steering rods from MSRP, and CRP's servo-saver replaced the stock units. Again, MSRP offers bushings that fit over the ends of the A-arms, and they help to reduce wear and slop. To get the A-arms to fit properly, you'll have to do some trimming on the chassis with a sharp X-Acto knife. Trim a little at a time until you get the desired results.

Although the standard three-step speed control is adequate for the stock version, I opted for a more progressive unit that has a little extra punch. For this application, I chose the new Altech PK 122 electronic speed control with reverse. Some unique features of this unit are the built-in fuse and pre-wired connectors. The fuse is mounted directly in the unit, and that's quite a departure from the norm. I think the jury is still out on this design, and only

(Continued on page 98)

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SILENT RUNNING



DELTA VILLAIN

DELTA'S* NAME is synonymous with high performance, and the company has been a major presence in the hobby industry for many years, providing precision parts and cars in every R/C scale. Its newest venture is the creation of a highly competitive, 1/10-scale, on-road electric car—the Villain. This car represents the culmination of many years of research and development. The Vil-

lain's design fuses the most advanced, race-proven technology into one great racing machine.

THE KIT: Delta offers two versions of the Villain kit, and there's a variety of options, e.g., a complete Hyperdrive Belt System from S.S. Industries*. The major difference between the two versions is in the front suspension group. One version



by JOE BRUNI

offers a crossbar, or static, front-suspension system, while the other offers a totally adjustable front-shock suspension system. Both kits include the same extensive number of high-performance features.

The Villain's main chassis plate is composed of a graphite composite, flat-pan-style chassis that seems to be standard on all today's top 1/10-scale on-rollers. To this is coupled a unique rear drive pod. The lightweight, aluminum pod is pre-drilled

to accommodate a motor for the included direct-drive (spur-to-crown) gear, or the more advanced optional hyperdrive belt system. The pod also houses a bullet-proof aluminum rear axle that's mounted via precision ball bearings. Another interesting feature is that the rear diff hub slides onto the rear axle riding on another set of ball bearings, thus allowing not only the non-diff wheel to spin smoothly, but also allowing the diff side to spin smoothly and so dramatically decreasing rear-axle friction.

The drive pod is mounted on an impressive bridge system. Connecting the bridge to the rear pod are three Delta, oil-filled, coil-over, spring rear shocks. The kit also has a shock-resistant Kydex front bumper, four nylon body mounts, two servo mounts and four pre-trued and mounted Delta Track Magnet tires. This all adds up to a winning combination that's hard to beat.

ASSEMBLY: Putting the Villain to-



the assembly manual, which contains highly detailed mechanical drawings, footnotes, a complete parts legend and numbered steps, but is incorrect in places, periodically sending me off on a wild goose chase for unknown parts.

Following Delta's advice, I first boiled all the nylon components for approximately 45 minutes (see my article on dying nylon parts in the February '89 issue of *Car Action*).

I'll highlight only the most important areas of the kit. Start with the rear power pod: Essentially, its construction encompasses attaching the shock-mounting hardware to the pod, and that's one area where the thread-locking compound is essential if you want to avoid later mishaps caused by loosening of the parts.

After completely assembling the rear pod, move on

The Villain's "bridge system" suspension provides dampening for upward and downward and side-to-side pod movement.

gether took me only 5 1/2 hours from box to track. You'll need some basic tools, e.g. a screwdriver (I use a cordless electric screwdriver), needle-nose pliers, regular pliers, and some good-quality thread-locking compound. The kit's only flaw is

to the rear axle. As previously mentioned, the rear axle is made of solid aluminum, and it houses many of the essential components. Mount the diff hub in the way that suits your rear drive system (optional hyperdrive or conventional rear pinion/

DELTA

VILLAIN

Type On-road
Scale 1/10
Sug. Retail Price \$359

DIMENSIONS:

Overall Length 15 inches
Width 8.5 inches
Height 2.5 inches
Wheelbase 10.5 inches
Front Track 7 inches
Rear Track 6.75 inches

WEIGHT:

Gross (w/bat.) 48 ounces

BODY:

Type Not included

CHASSIS:

Type Flat pan
Material Graphite

DRIVE TRAIN:

Primary Pinion/spur
Transmission Direct drive
Differential Ball type
Bearings Ball bearings

SUSPENSION:

Front: Type Coil spring
Dampening None
Rear: Type T-plate
Dampening Triple oil-filled, coil-over shocks

WHEELS:

Front: Type BBS style nylon
Dimensions (DxW) 2x1.125 inches
Rear: Type BBS style nylon
Dimensions (DxW) 2x2 inches

TIRES:

Front/Rear Foam

ELECTRICS:

Motor 05/540 (not included)
Battery Saddle pack (not included)
Speed Controller Electronic (not included)

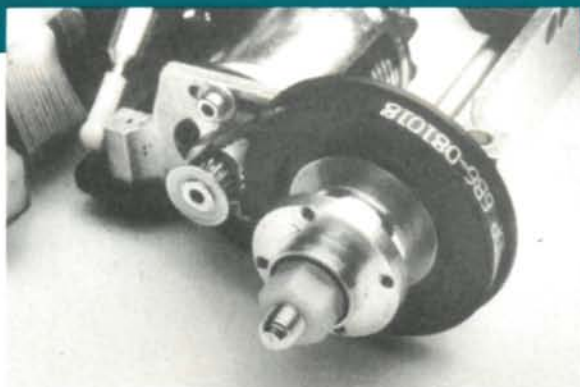
OPTIONS AS TESTED:

Futaba Magnum Jr.; Novak NESC-4 electronic speed control; Twister Stock motor; Hyperdrive belt and pulley system; Sees mag wheels; TMS slicks; SCR battery.

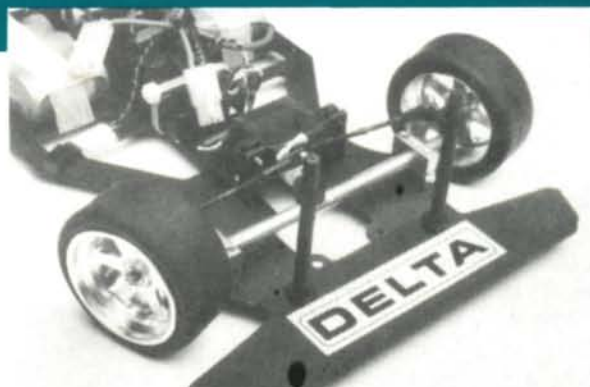
COMMENTS:

An exceptionally responsive, fast, on-road performer. The car handled equally well on an indoor carpet roadcourse and on an outdoor asphalt roadcourse. The low center of gravity allows the Villain to be driven deeply into the turn. The optional Hyperdrive belt-and-pulley system made the car purr like a kitten. The manual is substandard and confusing at times. All told, Delta has a real winner on its hands.

VILLAIN



Included with the Delta Villain is the whisper-quiet S.S. Hyperdrive belt-drive system. To accommodate this system, the rear pod has extra-long slots on both sides.



The front suspension is the reliable crossbar design that allows on-the-spot caster adjustment. Note the sharp-looking TMS spoked aluminum wheels and rubber tires.

spur) you choose. My kit included the hyperdrive system, so I mounted the differential hub on the left rear of the pod. The easiest way to mount the axle is to first put the ball bearings into the pod, then slide the axle through, position the right rear hub, apply thread-locking compound to the Allen screw and tighten the hub securely onto the axle. Now put the pod on its right side, perpendicular to your workbench, and assemble the diff components.

I'll now look more closely at the "heart" of the Villain's advanced design: the bridge system. To understand the importance of the bridge, we must review what it's made of. Just visualize any simple bridge design. There's a main bridge plate that's like the deck that runs through a normal bridge, and it's coupled to two A-shaped bridge uprights that are attached securely to the rear part of the main chassis. The rear upright is the mount for all three rear shocks, while the front A-bridge is for mounting the antenna. Though not mentioned in the manual, I used the bridge plate, sandwiched between the A-shaped uprights, as a mounting site for an electronic speed controller. Attached to the bottom of the bridge plate is a flat graphite T-plate, which is suspended by two unique mono-ball-and-cup mechanisms. These mono-ball-and-cup mechanisms move freely on a fixed axis and act as the main pivot point between the rear power pod and the main chassis plate.

For this review, I chose Delta's front crossbar suspension. This system is similar to those used on many other on-road cars, and its main component is a tubular

aluminum bar that extends across the front of the chassis. At each end of the crossbar, insert the two steering kingpins, then slide on the two nylon steering blocks. Two small springs mount on top of the steering blocks and provide just the right amount of suspension for the front wheels. Connect the bar to the chassis by sliding it through the two support blocks that are mounted to the chassis. One of the two blocks is slotted, and this allows adjustments to be easily made.

According to the manual, one of the blocks should remain loose to avoid tweaking the crossbar, but after extensive driving, I discovered that tightening the bar at both block sites improves handling tremendously.

A set of nylon body mounts is included, as are four Delta track-magnet tires that are mounted on BBS-style wheels and accurately pre-trued.

PERFORMANCE: To run your Villain, you'll have to supply any 2-channel car radio, a motor, a speed controller, a saddle-pack battery and a body. For this report, I chose a Futaba* Magnum Junior 2-channel pistol-grip radio coupled to a Novak-4* electronic speed controller. For maximum power and speed, and to stay within the confines of the ROAR stock class, I installed a hot Twister* stock motor and a set of six, matched, Sanyo* SCR batteries in a saddle-pack configuration.

I topped off the Villain with an MRP* Monte Carlo body and finished it to resemble the Chattanooga Chew stock car. For this, I relied on Pro-Cut* Decals and Eric Goldschrafe, who did a great paint job. I also used a product called Slip

Stream from Paragon Racing Products*. It's a two-part cleaner and wax that enables you to remove all excess oils and dirt from Lexan and apply a shiny coat of wax.

Since I compete on both indoor and outdoor on-road racing circuits, I decided to test the Villain on both turfs. If you're a New Yorker and want to compete at an indoor carpeted facility, then Island Hobbies in Hauppauge, NY, is the place to go, and that's precisely where I went for the first part of my track test.

For proper battery charging, I chose a Model Craft* Pro-Tech digital 700 AC/DC charger, which features automatic trickle, AC/DC power, discharge and an LCD meter that can register either amps or volts. After a quick charge to the SCRs, I wheeled the Villain to the starting line and "floored it." At first, I heard only the sound of diff kicking in, and then the car shot around the turn like a stone from a slingshot.

But wait a minute! What happened to the sound of those gears grinding away? Not here, pal—we're talking *hyperdrive*! This baby purrs like a kitten. On about the fourth lap, I noticed that the car's rear end was too soft in the corners, so I rolled into the pits and quickly readjusted the rear shocks by tightening the spring load. Then I rolled onto the track for 7 minutes of fast oval racing. Even though I'm accustomed to the Island Hobbies racetrack, I tend to catch a wall here and there, but the Delta held together extremely well.

The outdoor facility was larger and more difficult because it's a roadcourse with multiple hairpin turns. No matter

(Continued on page 164)

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PROJECT PUMPKIN

(Continued from page 84)

time will tell if other manufacturers will go this route. I do like the pre-wired connectors that eliminate the need for soldering. The reverse mode also has a delay feature that helps reduce stress on the transmission. Adjustments are easily made with the use of LEDs that indicate the proper amount of sensitivity for forward, neutral and reverse.

Control is offered by MRC's Top Gun, 2-channel pistol-grip radio. The transmitter incorporates servo reversing and has easily accessible throttle and neutral adjustments. There's also a charging jack for charging the optional Ni-Cd batteries. The steering servo is the fast, high-power variety, and the transmitter has a light, well-balanced feel. Also included is a BEC-type receiver that eliminates the need for an external power supply and so keeps the weight down.

The stock 05 motor was replaced with a Twister* stock motor with off-road brushes for added low-end torque. As a reference point for performance, and for greater top end, I swapped the standard, 11-tooth pinion for a 13-tooth version.

Before the shakedown run, I had to

(Continued on page 100)

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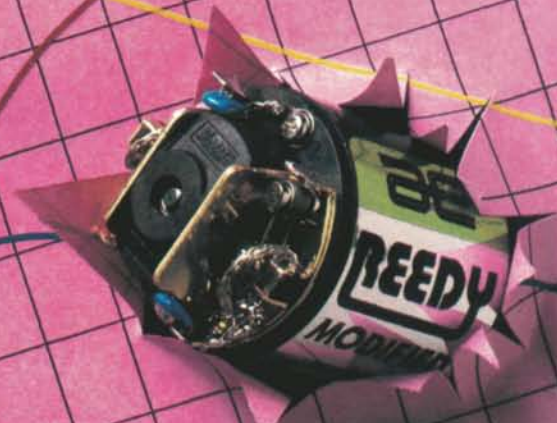
(Graph shown represents actual computer readout of Reedy Modifieds motor.)

CURRENT

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PROJECT PUMPKIN

(Continued from page 98)

charge the batteries and mount the body. Choosing a body turned out to be tougher than I had anticipated. After looking at a variety of 1/12-scale bodies that were available for this application, I kept coming back to the body supplied with the kit. I'm sorry to say that there isn't much to choose from in the after-market area for this scale. Obviously heavier than a Lexan body, with its durability and good looks, the '53 Ford was my choice. When Wally Caron of R/C World had covered the injection-molded body with a dozen coats of Rhubarb Red, my sleeping "gourd" looked ready for an awakening.

PERFORMANCE: For my first run, I opted for a smooth surface so that I could get a handle on any fine-tuning that might be needed. After dialing-in a little steering trim, I was ready to let it rip. The increase in acceleration was quite noticeable, but considering the motor and pinion combination, it wasn't unexpected.

After putting it through its paces on the blacktop, I pulled it over to see if anything had loosened or fallen off. Everything seemed to be in working order, so I packed up my gear and headed to a nearby construction site, thinking, "What the heck; if it could hold up there, it could hold up on any off-road track."

I threw in a fresh, 1400mAh, 6-cell pack from MRC. Since they provide a slightly longer running time without adding weight, these "sport" packs are becoming more popular with the heavy-metal crowd.

It was difficult to drive the Pumpkin over some terrain without having it get up onto its side on two wheels. When you've adapted your driving style to this "bicycling" effect, you can really get this baby to fly. For a little competition and com-

(Continued on page 102)

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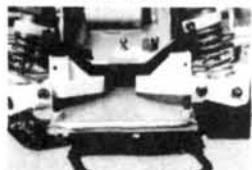
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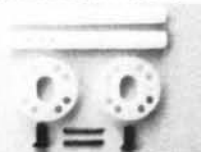
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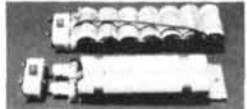
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PROJECT PUMPKIN

(Continued from page 100)

parison, my brother brought along his Blackfoot, and he soon found out that he wasn't dealing with just any Pumpkin. On a relatively smooth surface, my little red gourd was more than a match for its bigger brother. Its straightaway speed and sure-footedness through large sweeping turns was quite impressive, but handling on tight and bumpy sections was another story: I was fighting a losing battle.

Although the oil-filled shocks were pumping their little hearts out, the limitations of the basic suspension design began to show. If the truck came off a jump at just a very slight angle, landing on the rigid rear axle would throw it off to the side, and changing to stiffer springs only exaggerated the problem. In relation to the steering servo, the front A-arm geometry limits the turning radius, so it's a real chore to get the truck to make a tight turn. The tendency of the front wheels to get "light" under hard acceleration (the wheelie bar provides a little relief) compounds the problem.

Don't take these comments the wrong way. Despite all the abuse I passed out, my Pumpkin came through no worse for

(Continued on page 114)

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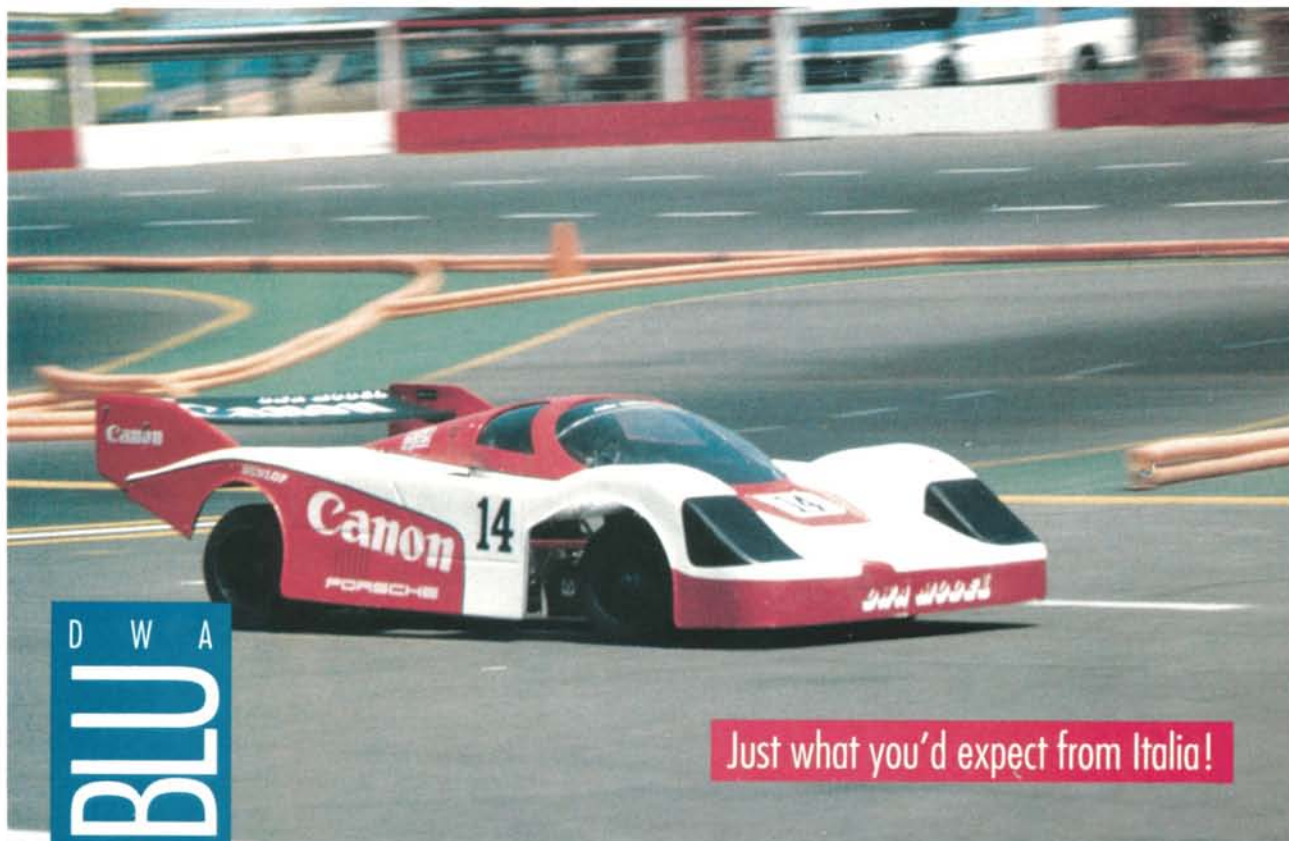


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D W A BLU 2

by MIKE LEE

IN THE UNITED STATES, most 1/4-scale racing takes place on oval tracks, and the rest takes place on drag strips. In Europe, the most popular arenas for 1/4-scale activity are road

courses. Although they're not nearly as fast as ovals, these courses are, nonetheless, very challenging, as drivers try to maneuver their large R/C cars through twisting, winding tracks. Only a skilled driver can drive competitively on these road courses.

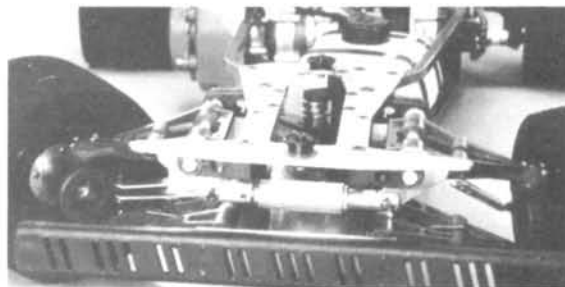
One of the newest road cars in 1/4 scale is the Blu 2 road racer from DWA of Italy. Distributed by Condor Trading/Andes Hobbies*, the Blu 2 is a true-to-life, 100-percent road racer, not just a converted circle tracker. The Blu 2 was designed from the ground up as a thoroughbred road-racing machine. It

features double-wishbone suspension arms, huge anti-sway bars, full planetary-gear differential, four rotor-disc-brake units and quite a few other goodies that you'd expect on a full-blown racing machine.

ASSEMBLY: If you don't have experience with model cars—and I mean sophisticated model cars—don't even *think* about the Blu 2. This isn't a toy, by any stretch of the imagination, and you had better be serious about running this racing machine. What's more, you'll have to assemble things on your own, because the instructions are almost entirely in Italian! There are some instructions available in English, but the content is poor, and they offer little, if any, guidance. I assembled my car al-

most entirely by following the photos in the instruction book, which were more helpful than the written instructions.

On the suspension are four sets of large, glass-filled, nylon, wishbone suspension arms. They're extremely tough units, and should carry the Blu 2 very well. There are two wishbones for each corner of the car, and all are interchangeable. The wheel spindles are mounted to the wishbone pairs with large ball sockets and balls, and these provide good freedom of movement at the spindles. The arms are then

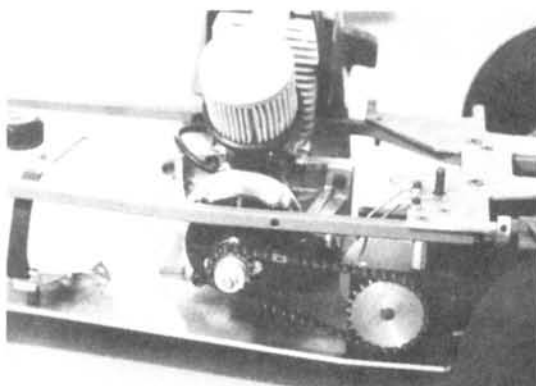


The mono-shock front suspension of the Blu 2 gives little in total suspension throw, but it's very effective for the ride. Note the large hole in the upper chassis center where the radio battery is suspended.

mounted to the lower chassis by pivot pins and locked down with C-clips. When assembling this car, you'll probably add a few new tools to your collection, including C-clip pliers to mount the huge C-clips (forget about using your fingers!).

The anti-sway bars, mounted at the lower wishbones, are placed through the lower mount pins and into the forward edge of the wishbone. It takes some patient maneuvering to seat the sway bar properly. At least, the rear end is easier to mount than the front!

The wheel spindles are ball-bearing-supported all the way around, and the spindle is locked into place with a self-locking nut. Overgrown steering arms are mounted on all four corners of the chassis, and this seems unusual, but it allows front steering (naturally) and provides rear breakaway action if the rear wheels are hit hard. It's a nice touch, and certainly one that could allow a future modification to 4WS.



The business end of the Blu 2: a 3.3-c.i.-displacement gas engine coupled to a centrifugal clutch and pinion and primary chain and sprocket. Note that the brakes are on the idler shaft with the primary sprocket. This prevents overheating from the clutch-bell housing.

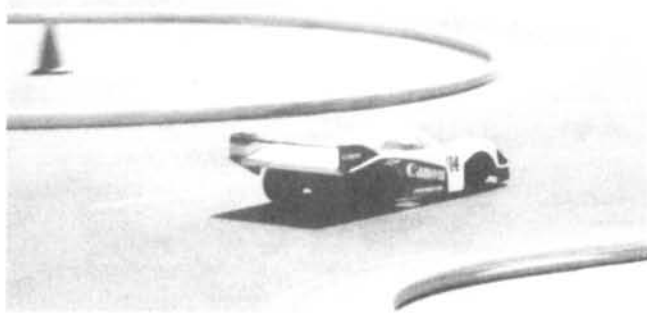
although they don't feel as though they can provide adequate support for the 30-pound car, the steel members add the stiffness where needed. Part of the stiffness is also owing to the engine, which is used as an integral part of the chassis assembly.

The main differential at the rear end is one hefty assembly that contains the planetary gears for the diff, the ball-bearing supports, the main chain sprocket and the main drive sockets. The main diff supports are also made of glass-filled nylon. All chassis parts are held to

the chassis by countersunk, sturdy, steel screws. The dogbones from the diff are attached to the rear-wheel drive cups, just as they are on many smaller-scale cars. To finish it off, the entire diff is filled with light grease and sealed.

One of the more novel aspects of the car is that all the glass-filled, nylon parts that are bolted to anything else have the equivalent of heli-coil inserts for

(Continued on page 108)



On the 1/8-scale gas road course, the Blu 2 comes into its own. Quite maneuverable, it handled the undersize road course well.

The main chassis is a double-deck pan, which is supported by square, steel chassis members running from front to rear. The main pans are tempered aluminum, and

DWA

BLU 2

Type On-road car
Scale 1/4
Sug. Retail Price \$1,700

DIMENSIONS:

Overall Length 35.5 inches
Width 20.5 inches
Height 11 inches
Wheelbase 23.75 inches
Front Track 19 inches
Rear Track 20.5 inches

WEIGHT:

Gross (w/bat.) 32 pounds

BODY:

Type Porsche 962 GTP
Material ABS plastic

CHASSIS:

Type Monocoque pan
Material Aluminum and steel

DRIVE TRAIN:

Primary Engines sprocket/
main sprocket
Transmission Chain drive
Differential Gear
Bearings/Bushings Both

SUSPENSION:

Front: Type Double wishbone
Dampening Oil-filled monoshock
Rear: Type Double wishbone
Dampening Oil-filled, coil-over shocks

WHEELS:

Type (f/r) Three-piece ABS plastic
Dimensions (DxW) (f/r) 4x3.5 inches

TIRES:

Front & Rear Foam rubber

ELECTRICS:

Engine Mathe 3.3 c.i. gas
Starter Recoil

OPTIONS AS TESTED:

Futaba Magnum PCM 3-channel transmitter and receiver; DWA servos.

COMMENTS:

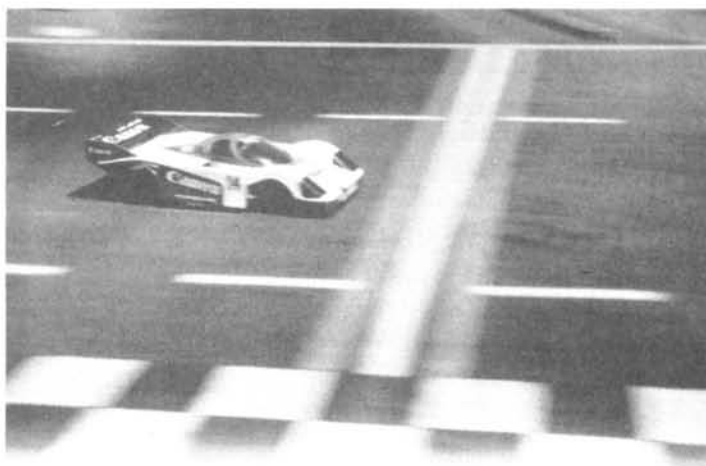
A very sophisticated road car that handles much like a smaller electric car, the Blu 2 is fast and quick, with excellent road manners. Engine size is illegal for racing events in the U.S., but legal engines are available. Brakes are excellent, as is the differential. Unless you read Italian, the instructions are almost nonexistent. The small amount of English is of no use, but the photos are a great help. If you can get the Blu 2 assembled, you'll have a very rewarding car.

(Continued from page 105)

the hole where the bolt seats. A whole mess of these dandy things are included in the kit. To use them, place the insert over the hole in the nylon, and smack it into the hole with a plastic mallet. Once the bolt has been torqued into the insert, the insert expands fully into the nylon and creates a solid, threaded base.

To finish the rear assembly, the main drive-train components are mounted to the chassis. The drive line starts at the engine sprocket with a chain to a primary sprocket. This is mounted to a jackshaft that also holds the brakes and secondary sprocket. A chain goes from the secondary sprocket to the differential.

At the jackshaft, I found some

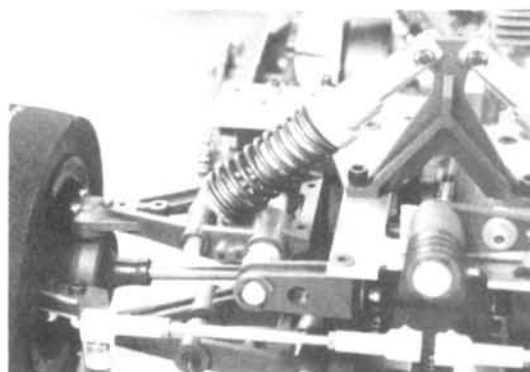


Next, the engine is mounted. This huge 3.3-cubic-inch Italian-made monster takes the Blu 2 out of the realm of the traditional 2.3-c.i. engines used for 1/4-scale racing in the States. (Future versions will feature a QSAC-legal 2.3-c.i. engine.) The engine features a reliable DelOrto carb with a dia-

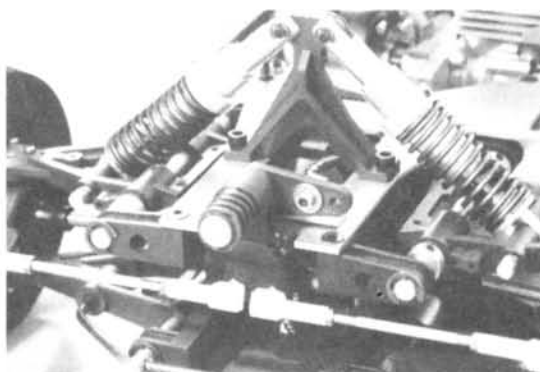
springing comes from 5/16-inch coiled piano-wire springs at the lower wishbones. Small cam adjusters allow you to adjust the forward ride height with the springs. Maximum travel is varied by limiting bolts that are mounted against the upper wishbones. At the rear, each side is supported with oil-filled, coil-over shocks. Believe me,

you can barely make the shocks move in your hands, but when they're mounted to the shock towers, they move enough to provide the needed suspension travel.

Finishing off the chassis are the foam tires and plastic rims. Those of you who remember



A look at the rear suspension of the Blu 2 reveals a very well-thought-out car. The main rear wishbones are suspended by two huge coil-over oil shocks. Note the rear-end tie rods connected to a servo-saver to absorb impact to the rear wheels.



very effective brakes. Unlike some domestic 1/4-scale cars in which the brakes are a part of the clutch-bell housing, the Blu 2 has a set of four rotor-disc brakes. All are mounted on the jackshaft and pressured by metal plates. An arm from the throttle linkage ties the brakes to the throttle action. It takes little pressure to lock up the wheels, and this creates brakes that won't fail. Their location (away from the clutch and engine) prevents the brakes from heating.

phragm fuel pump, and it's fitted with a pull starter, a kill switch and a superb tuned pipe. Magneto ignition is standard equipment. The engine is then mated to a rather standard centrifugal clutch and to the main sprocket.

When fully bolted into place, the entire chassis becomes rigid, allowing the suspension to work as designed. The suspension is assisted at the front by a mono-shock oil-filled dampener that's actuated by lever arms. The

putting together the older Tamiya rims (with eight to 10 screws, nuts and washers for each rim) will feel right at home with these rims, but now you get to use some big tools, and you can stand on the rims while you bolt the three-piece wheels together around the foam rubber tires. If you're not ready for it, assembling these monsters is a bit surprising. The tires are simply overgrown foam tires like those used in smaller-scale road cars. Four bolts hold the completed rims

(Continued on page 182)

MATERIALS NEEDED

- 2 sheets balsa $\frac{5}{32} \times 3 \times 36$ inches
- 8 balsa or plastic squares $\frac{1}{4} \times \frac{1}{4} \times 24$ inches
- 2 round, hard, plastic tubes $\frac{1}{4} \times 12$ inches
- 1 package of nylon hinges, 6 count
- 1 package No. 2 wood screws, 24 count
- 2 sets wheels and tires
- 4 $6-32 \times \frac{1}{2}$ -inch screws with 8 washers
- 1 piece - rubber-coated wire, 12 inches



LOW-DOLLAR

CUSTOM TRAILER:

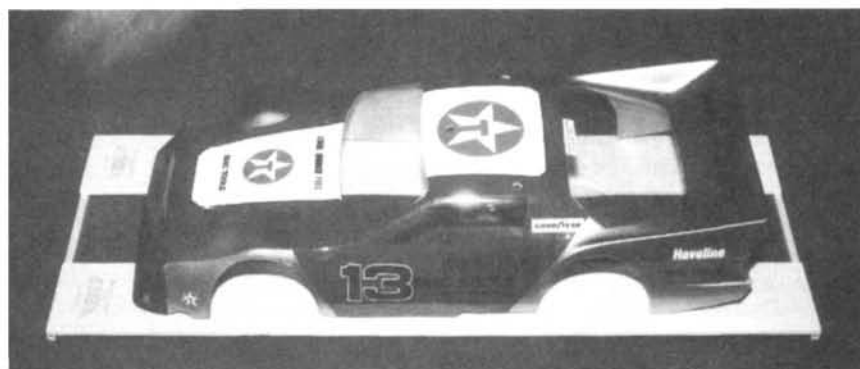
by JIM SHEPKA

How to build your own—quickly

PART 1

WHAT BETTER WAY to showcase your latest “trick” paint job or newest street rod than by displaying it on your own custom-built trailer? I know what you’re thinking: “another do-it-yourself project that requires an engineering degree to figure out the plans, or a mega-buck machine-shop tool to help fabricate the parts.” Hey!—let’s get real here! Not everyone has the patience or resources for that type of project, and this one can be completed inexpensively in just a few hours with basic hobby tools and supplies. In this first installment, I’ll take you through a few simple steps to get you started on the construction of your own customized trailer.

First, decide what type of chassis/body configuration you want to build around. The typical off-road, open-wheel, R/C car will have a shorter overall length (nose to tail) than an equivalent full-bodied car. For this project, I chose a $\frac{1}{10}$ -scale pan car with a full body. When you’ve decided which vehicle you want to tow or show, visit your local hobby shop to buy the appropriate materials (see chart).



Put the body on the frame to determine the correct dimensions.

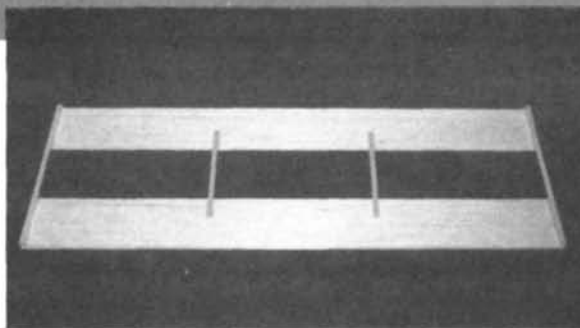
Now, begin by putting two 3-inch-wide balsa sheets on a smooth surface and, using a razor knife, cut both to a length of 24 inches. (Don’t throw out the remaining pieces, because you’ll need them

later.) Now take a $\frac{1}{4}$ -inch square strip of balsa or plastic and cut it into four $9\frac{1}{2}$ -inch lengths; set these aside. On a smooth surface, put the 3×24 -inch sheets side by side and $3\frac{1}{2}$ inches apart. (Double-check

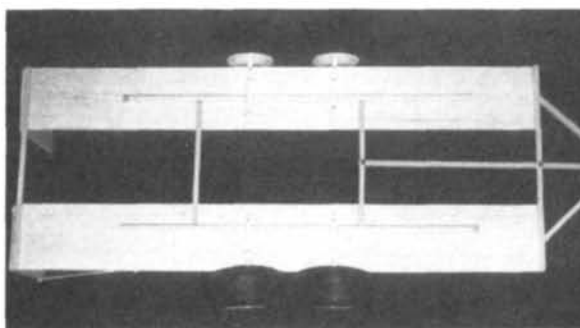
LOW-DOLLAR CUSTOM TRAILER:

your measurements to make sure the pieces lie square.) Using either wood glue or CA, cement the $\frac{1}{4}$ -inch strips across both ends and at equal lengths across the frame. Your basic platform has now been completed! (I told you this would be easy!)

Let the sub-frame sit for a while to allow sufficient time for the cement to set, and move on to the axle assembly. Cut the plastic tube into four 4-inch lengths and set them aside. (If the cost of wheels and tires is important, go with a single axle here, and skip the next step.) You'll now have to determine the space needed to put the axles on the frame. Since every wheel/tire combination has its own diameter, the easiest way to take this measurement is by placing two wheel/tire combinations on their sides, so that they don't roll away, with the tires approximately $\frac{1}{2}$ inch apart, and then measure the distance between the center of both rims. Once this has been determined, take the 4-inch plastic tubes and space them according to this measurement; then, making sure that the tubes are square to the frame, glue them into place. When the glue has set, drill a series of holes through the axles, being careful not



Note the clean, simple construction techniques incorporated in the design. (Just like the real thing!)



For additional strength, secure all contact points with screws.

est loads. The tires will be added last so that you can continue to work with a flat surface.

The trailer is now beginning to take shape. To complete the basic design, add a hitch assembly and loading ramps. With the sub-frame still upside-down, take a $\frac{1}{4}$ -inch square strip and attach it along the center of the frame, extending it 8 inches past the front of the frame. This will be used for the hitch. Cut out a set of stabilizer bars to your liking, and glue them to the frame, as shown. For strength and appearance, don't forget to secure all

contact points with wood screws. A simple ball-end link can be attached to the end of the center post, and this can be used for your towing vehicle.

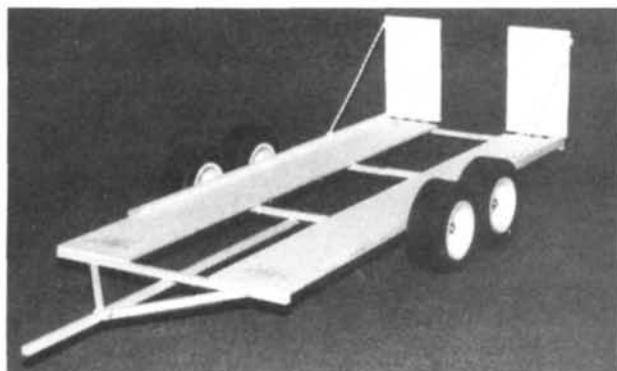
Now move to the rear of the frame and

attach the ramps. For this you'll first have to turn the frame right-side-up. Cut the 3-inch-wide sheets left over from the first step into two 4-inch lengths, and glue a set of nylon hinges to one end of the ramp. When the cement has set on the ramp side hinge, attach the ramp and hinge assembly to the platform with CA. Repeat the process for the other ramp. Next, insert a screw into the outside edge of the ramps and another along the top of the frame. (Don't screw them all the way in.) Now take the rubber-coated wire (or a substitute), put a U-bend in one end, and secure around the screw on the frame. Tighten

down accordingly. With the ramp in a vertical position, measure the correct distance with the wire and cut to the desired length. Again, put a U-bend in the wire and clip it over the screw. This design will prevent your vehicle from rolling backwards. With that, the sub-frame is complete.

To finish the basic design, the rims must now be secured to the axles. Simply thread a screw of an appropriate size (one that will fit snugly) into the end of the axle. (I used 6-32 screws.) Take your time on this one; make sure they go in straight. When you've done this to all four axles (or two axles, as the case may be), unscrew the screws, put a washer on both sides of the center of the rim, and insert the screw through the rim (don't forget the washers). Put a drop of thread-locking compound on the end of the screw and re-thread it. Tighten it just so that the tire will rotate freely.

Well, there you have it!—a quick, inexpensive project that can put you ahead of the pack. In the next issue of *Radio Control Car Action*, I'll discuss some customizing ideas, including fenders, tire racks and lights. Stay tuned! ■



For appearance and support, attach stabilizers to the hitch post.

to drill through the frame. Next, put a drop of CA on the end of a wood screw and secure the axles to the frame. Complete this process on all four axles, and you'll find that this setup will support all but the heavy-

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PROJECT PUMPKIN

(Continued from page 102)

wear. Its overall performance, on a relatively smooth surface was hard to beat. With a few extra ounces in the front end, I'd highly recommend this type of setup for dirt-oval racing. The Altech speed control performed without a glitch and was very easy to install and set up. I particularly liked the reverse delay mode. The Twister powerplant was more than adequate for its assignment, and, finally, repeated attempts to abuse the transmission proved "fruitless"—get it?

I had fun with this one. Not only did I achieve positive results, but I also accomplished the project in a minimum of time and with little expense. If you're looking to wake up your tired Pumpkin, get off your gourd and get going!

*Here are the addresses of the companies mentioned in this article:

MRC/Tamiya, 200 Carter Dr., P.O. Box 267, Edison, NJ 08818.

Miracle Speedway Racing Products, 300 Pheasant Dr., Kalispell, MT 59901.

CRP, 3250 El Camino Real, B-3, Atascadero, CA 93422.

Altech Marketing, P.O. Box 391, Edison, NJ 08818.

Twister Motors, 657 E. Arrow Hwy., Suite H, Glendora, CA 91740.

SCOPING OUT

(Continued from page 70)

ity ones, e.g., those from Sermos Powerpole*. You'll have to use a set on the motor, because you must be able to unplug it before you can plug in the pulse checker.

The only other thing I didn't like is that Panda didn't use a blue wire for the motor lead. The controller has two red and two white leads for connecting the motor and the battery. As always, the two red leads are connected inside the controller and are interchangeable, but one of the white leads must go to the battery and the other goes to the motor. Swap these two,

(Continued on page 128)

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DIRT DIGEST

by BILL O'BRIEN & BOB KANE

PREPARE YOUR CAR FOR WINTER DRIVING

HERE I AM AGAIN, and, no doubt, you're all dying to hear what I've been up to. Well, I've put the Maxxum on a back burner because of rumors that Kyosho might discontinue the car (this may or may not already have happened by the time you read this). With the Northeast in the grip of winter, however, it's probably a good idea to discuss some winterizing tips; we'd all like our winter rides to last for the summer as well.

I've received a few letters from readers who are worried about the venerable Tamiya Frog. People have finally realized that it has been discontinued, and they're worried about the availability of replacement parts. Having a few Frogs of my own, I'm concerned, too. I originally planned to dedicate some of this month's



sleet and frostbite just so you can keep your hobby going all year. Now, I'm not saying that there's anything wrong with being totally nuts, but you could be so overcome by the elements that you might neglect some of the basics.

It's easy to forget that "ice" is a three-letter word for "frozen water," and that water is the great destroyer of R/C equipment if you're unprepared for it. Rust, corrosion and electrical problems are the telltale signs that you've ignored nature's attempt to make snow cones. The good news is that there's absolutely no need for

any of these things to happen.

First, acquire your winter supplies, which should include: alcohol (the rubbing kind, not the drinking kind); WD-40, or an equivalent penetrating lubricant; grease that won't freeze at typical winter temperatures (some grease does); a stiff-bristle toothbrush; some clear food wrap (the thinner the better); a few wire ties; a tube of silicone sealant; and a Thermos bottle.

Underwater Radio

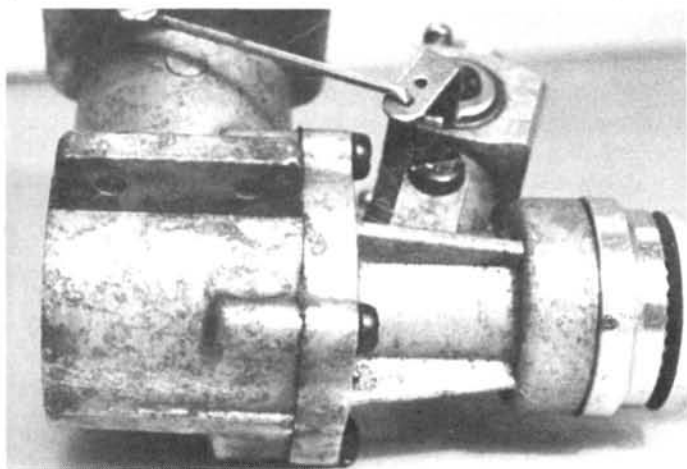
Let's start at the brain of your car: the receiver. After you've connected all your servos and the receiver battery (if you aren't using an ESC), pretend the whole mess is a sandwich and fold the clear food wrap around it, making sure that the servo wires are outside the fold. Gather up the loose ends at the sides of the receiver, and bring them up to the servo wires as well.

Knot a wire tie around the servo wires and food wrap tightly enough to hold everything in place, but not so tightly that you take the chance of crimping any of the wires (it's the difference between snug and strangling). Put a dab of silicone sealant on your fingertip, and coat the wires where they exit the food wrap at the wire tie. This will seal the assembly.

Now, although it may sound a little silly to you, do the same thing to your battery. My battery?!—yes, your battery. The shrink wrap around the cells is merely there to hold them together, not to seal the pack against the weather. The soldered contact points between the individual cells are highly susceptible to rust, and if you don't protect the pack, they *will* rust very rapidly. (If you're switching back and forth between buggies and boats, pay special attention to the battery packs; I speak from personal experience, having destroyed about \$60-worth of packs.)

Damp Speed

Generally speaking, servos won't give



Nothing is immune! This glow engine went through hell and high water, and the result is the scaling you see on the case. Just use a toothbrush dipped in seltzer or baking soda to remove it. (It's a lot easier to dry the engine before putting it away.)

space to the problem, but the winterizing material runs a little long, so I'll save it for next time.

Weather Wise

You know you're an ardent R/Cer if you're willing to stand around for a few hours in 90-degree heat just for the pleasure of a four-minute run. Of course, you're totally nuts when you wander out into arctic temperatures, braving snow,

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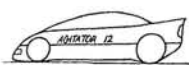
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Modified—\$42.00

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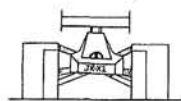
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YZ-10



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T-1 — \$98³²

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DIRT DIGEST



Left: Although there's a variety of dirt tires available, few are good for snow. Paddle tires (left) are the best overall tires for powdery snow; on monster trucks, treaded tires seem to be better than spikes.

Below: A little plastic, a tie wrap and some silicon sealant will keep your receiver dry under the most harrowing conditions.

you much trouble. Most are water-resistant and some are actually waterproof. As long as you don't drop them through the ice into the frozen pond, you should be safe.

If you use a mechanical speed controller, either actuated by, or mounted on, a servo, be sure to clean the wiper arm at the end of the day with alcohol. If you let it go too long, clean the contact with an eraser first and then wipe it down. Tamiya sells a switch grease that will give your speed control easy action and reduce the damaging effects of moisture.

Electronic speed controllers are another matter entirely. Snow and ice obviously melt when heated, and ESCs produce heat as a byproduct of the energy they regulate. You can't enclose an ESC because it needs to "breathe" in the best way possible, and because ESCs must be mounted in a stream of air, they're very susceptible to things that go splash.

So what do you do when you get one wet? First, disconnect it as soon as you discover the problem, then flush it liberally with alcohol. Alcohol absorbs water, and it will carry the wet stuff out of the ESC with it. If you have compressed air handy, blow-dry the ESC (you can do the same with a hair dryer, but on the blow setting, *not* with heat). Most of today's ESCs are Tempfets (an acronym for Temperature-sensitive Field-Effect Transistors) that shut down when they overload rather than burn up, so when the ESC is dry, you shouldn't have any problems.

Soggy Connectors

Without invading the world of electronics, let's just say that silver is the best metal for a connector, followed by copper, gold and then aluminum. There are



more on the list (all the way down to carbon), but if silver was rated at 100, copper would be 98, gold 78, and aluminum 61. So why, if it's third on the list, does everyone proudly declare that they're using gold connectors? Why not use silver or good old copper?

The answer is corrosion. If you take a hard look at silver, you'll notice that it starts to corrode after a short time. Copper is just a little better than silver; on the other hand, although it's only 78 percent as conductive as silver, gold is very resistant to corrosion, except when it's exposed to more than your average run-of-the-mill airborne materials, e.g., acids and salt water. Carbon is the most resistant to corrosion, but its conductivity rating, compared with that of silver, is only 0.05.

Always clean your connectors! At the end of the day, give them all a rub down with alcohol and then dry them. If you see some discoloration, use an eraser to clean them. Never, ever, ever use sandpaper! Even an eraser will strip off some of the conductive material, but sandpaper will strip it more than anything!

Wet Magnets

While some motors might use wet magnets, none of the motors currently available works well when wet. At best, the armature shorts out and it locks up. In fact, the most pitiful sight in the R/C world is

(Continued on page 192)

T A M I Y A

Fire Dragon

by BOB GAGNE

Fire-breathing, entry-level off-roader



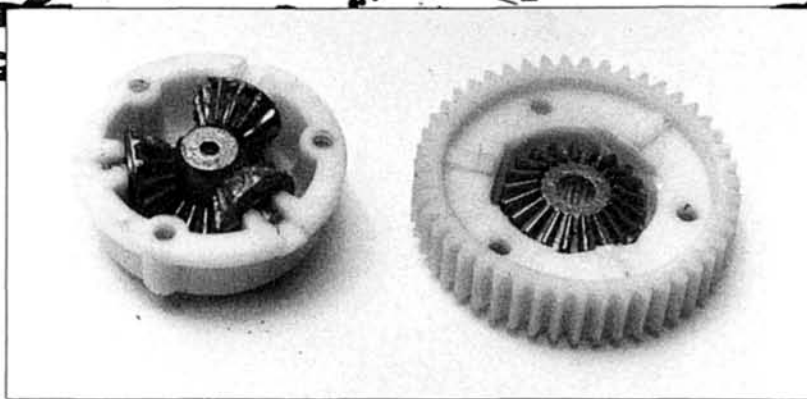
THE NAME "FIRE DRAGON" implies a lot, and Tamiya* has produced a car that seems to live up to its name. A modified version of the Thundershot, the Fire Dragon is an entry-level car. Its body looks like a dragon, and the decal set certainly shows plenty of flames, but the real fire is in the way the car runs.

THE KIT: The Fire Dragon comes in a compact box (at least, for a Tamiya kit!) that neatly displays all the most spectacular parts, like the metal gears, axles, gear-box joints and motor. For easy location and identification, the other parts are in lettered bags, and the molded parts are on lettered and numbered trees. Tamiya is an expert at packaging, and this is one reason why its kits are so easy to assemble, even for a beginner.

ASSEMBLY: This kit, which went together easily,

seems to be aimed at the first-time modeler, as the number and complexity of the parts were kept to a minimum. As always, the instructions were very clear and easy to follow. Tamiya instructions always include line drawings of each step and a legend along the left side of each page to illustrate the hardware needed. The hardware drawings are lettered and numbered to help the builder find the right part, and the header on each hardware bag has a corresponding scale drawing of the parts it contains. This system is so well devised that you won't get lost if you do each step in order.

The Fire Dragon's instructions, however, aren't quite up to the high standard of other Tamiya instruction books. Some of the usual helpful assembly tips are absent (like the suggestion that thread-locking compound should be used on all metal-to-metal fasteners; I strongly recommend this). Since this car comes with several shock collars and shock pistons, there should be a section in the instructions that tells the modeler what effect each of these will have on performance. Many first-time builders will be afraid to make changes if they have no idea what these changes will do. Information on suspension adjustments and gearing is also needed.



The differential assembly has metal planetary bevel gears and a nylon main diff gear. Probably a strong, trouble-free unit.

Tamiya parts always seem to fit perfectly, and the Fire Dragon kit is no exception. The only real fitting involves making sure that no remnants of the tree remain on the molded parts. Trimming these parts closely with a hobby knife so that no flashing is left to bind and catch on other parts is very important when assembling the suspension parts. Trimming is especially important when assembling the plastic shock absorbers. These units work very well if you take your time and use a little patience when trimming the shock-absorber pistons. The slightest excess plastic along an edge will turn these fine units into something that resembles a friction-type shock, which sticks all the time. I think Tamiya mentions something about making sure that the shock piston is smooth on the edges in other instruction books, but the warning is missing in this one.

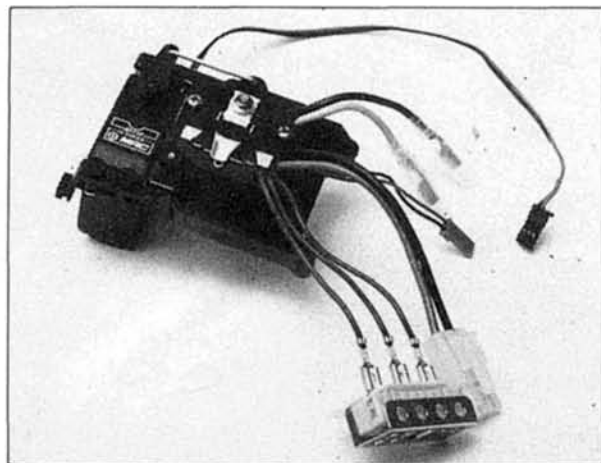
The actual steps, which are clear and logical, start with a radio check. Since the front and rear gearboxes and suspension parts are assembled and then attached to the tub chassis, the steering servo must be in place first, so Tamiya starts with the

radio gear. The servo-saver and mounts are attached to the steering servo, and then the unit is bolted into the tub, with the servo-saver protruding below the tub. Tamiya is to be congratulated on its use of ball links for the steering rods, but why did they use the old bent-wire-in-a-plastic-hole system for the tie rod? These things pick up dirt and soon wear to the point of being very sloppy. You want as little play as possible here. One threaded rod and two ball links would have done quite nicely. This is one place where an inexpensive modification can be made later to enhance performance and increase the durability of your front end.

Once the servos have been installed into the tub chassis, the instructions move on to the assembly of the rear differential, the gearbox and the attached suspension parts. I never understood why Tamiya molds the lower suspension-arm bracket right into the transmission case; a good, solid blow to the suspension (especially the front) and the entire transmission unit must be removed to make the repairs. A bolt-on bracket makes more sense, but Tamiya doesn't use this system on any of its 4WD cars.

The diff itself is a good, solid unit that incorporates a planetary gear system housed in a tough, nylon diff-gear unit, front and back. No adjustment is possible for front-to-back slip, but remember, this is an entry-level car. Once the diff is assembled, the other transmission gears are installed into the case, and the suspension is bolted on.

The suspension uses the lower A-arm/upper control-arm system with plastic, oil-filled, coil-over



The Tamiya speed control mounted on its tray and ready for installation in the tub chassis. Note the bent-wire link, which is a weak point in the system.

MRC/TAMIYA

FIRE DRAGON

Type 4WD off-road
Scale 1/10
Sug. Retail Price \$214.95

DIMENSIONS:

Overall Length 15.25 inches
Width 9.25 inches
Height 5 inches
Wheelbase 10.25 inches
Track (f/r) 8 inches

WEIGHT:

Gross (w/bat.) 3 pounds, 9 ounces

BODY:

Type Off-road buggy
Material Lexan

CHASSIS:

Type Monocoque tub
Material ABS plastic

DRIVE TRAIN:

Primary Pinion/spur
Transmission Gear drive
Differential(s) Gear
Bushings Bronze and plastic

SUSPENSION:

Type (f/r) Lower A-arm/upper control link
Dampening (f/r) Plastic oil-filled, coil-over shocks

WHEELS:

Type (f/r) Plastic one-piece
Dimensions (DxW) (f/r) 2.1x1.4 inches

TIRES:

Front/Rear Low-profile pin-spoke

ELECTRICS:

Motor RS-540s stock
Battery 6-cell stick pack (not included)
Speed Controller Three-step forward/reverse

OPTIONS AS TESTED:

MRC Top Gun radio; ball bearings; Tamiya EX 1700mAh 7.2V battery pack.

COMMENTS:

Although the Fire Dragon is an entry-level car, with some modification, it could be competitive in the stock class. The differentials are stronger and more durable because they have metal gears rather than the typical nylon. The instructions lack helpful hints, e.g., when to use thread-lock. Z-bend links cause slop and interfere with speed-control operation. Ball links on both ends would be a great improvement to this strong, entry-level car.

(Continued on page 124)

FIRE DRAGON

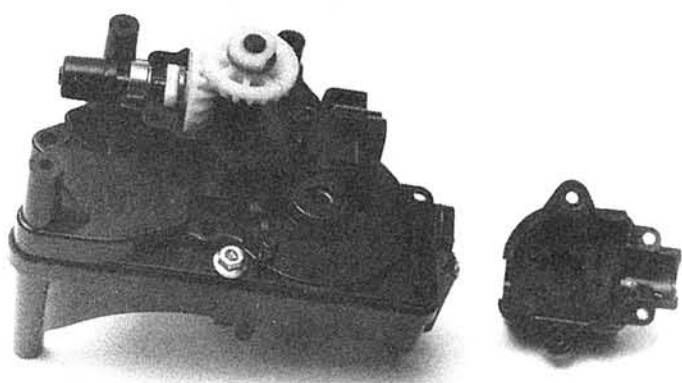
(Continued from page 121)

shocks. The system works well, but it could stick if carelessly assembled. One other inexpensive modification could be the installation of ball links and turn-buckle-type rods in place of the plastic upper control-arm units supplied with the kit. This modification lets you adjust the camber of each wheel so that the traction and handling characteristics of the car suit the track conditions—a must, if the car is to be competitive.

The last major steps are installing the rear and front gearboxes onto the tub chassis. The power is transferred from the rear to the front by a propeller shaft that runs along the left side of the chassis. Solid propeller shafts use less power than belts and chains, but they do require more parts, and this adds weight and eats energy. A drive shaft is also easier to assemble and

car. The Fire Dragon took everything in its stride. The stock Tamiya shock oil was a little too thin, so it was replaced with Team Losi* 40WT. To ease the Fire Dragon's tendency to bottom-out with every bump, I also installed the large shock collars for more spring tension in the rear, and I installed the small collars in the front.

The 15-tooth pinion gear didn't give the car enough speed down the long straight, so it was replaced with a 16-tooth gear that put some fire into the acceleration. Tamiya has designed a neat way to make sure that the pinion/spur gears have the

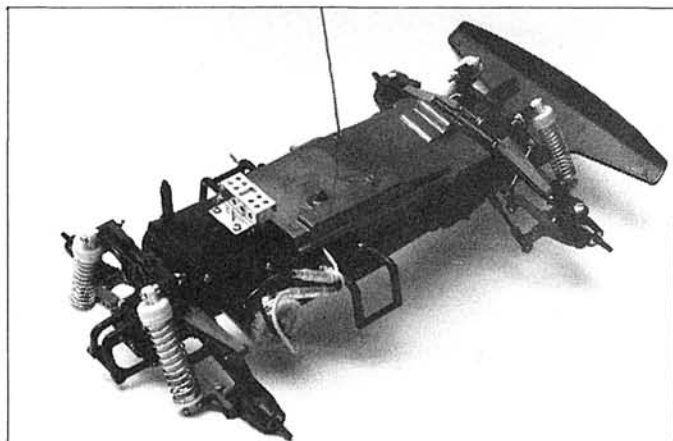


With the power takeoff cover removed, the rear diff assembly reveals one of the 17 ball bearings used in place of the supplied nylon bearings. The power is transferred to the front gearbox via a solid propeller shaft.

right amount of clearance: The motor mount is drilled with a series of paired holes that are labeled for 13-

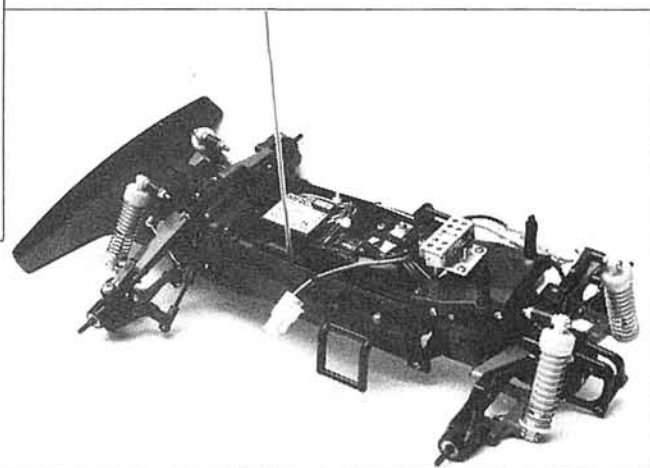
protruded too far down through the speed control's top plate and actually put negative pressure on the contacts, so after a few runs, the contacts bent and wouldn't maintain contact. Here again, a ball-link setup would work wonders.

After a few practice runs, it was time to see what the Fire Dragon would do against a car of known ability. A Vanquish that had been dialed-in for our track ran several races against the Fire Dragon, and although this seemed like a mismatch, the Fire Dragon held its own. The Fire Dragon has a strong tendency to oversteer, but with a minor modification to the steering and suspension to correct this handling flaw, this car would be able to beat the Vanquish, or perhaps even an Avante in a



Above: The complete chassis with all the radio gear installed. The battery mounts below the speed control.

Right: Tamiya's supplied chassis cover gives very little protection to the speed control, as dirt enters the chassis from below, through the battery port.



requires no adjustment, and this makes it the perfect choice for a car of this type.

There were no surprises in the assembly of the Fire Dragon; everything fit perfectly. After I had finished the body in a candy-apple red with a gold metal-flake paint job and applied the decals, I headed for the track.

PERFORMANCE: My test track is a challenging off-road course with long straights, tight S-curves and plenty of moguls and jumps—a good test for any

tooth to 17-tooth pinions. For the beginner, this is a perfect solution to the need for a selection of gears, while it maintains the right clearance when you can't see the gears themselves.

The speed control turned out to be a real problem. Although the Fire Dragon uses the standard Tamiya three-step mechanical device that usually works quite well, the linkage for the servo was poor. It employed the bent-wire system that I've already mentioned. In this case, the bend

4-minute stock-class race. The Fire Dragon has a lot of potential, especially as an entry-level car, and it should do very well in the stock classes at local club tracks. Perhaps this car is what you need to breathe a little fire at competitions!

*Here are the names of the companies mentioned in this article:

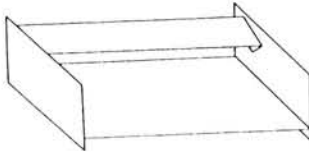
MRC/Tamiya, 200 Carter Dr., P.O. Box 267, Edison, NJ 08818

Team Losi, 1655 E. Mission Blvd., Pomona, CA 91766.

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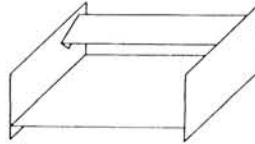
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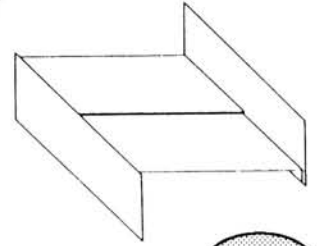


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SCOPING OUT

(Continued from page 114)

and the Panda PSC-1 is history!

I remove and replace the battery connector before I cut off the motor connectors. Just to be safe, I put a piece of blue tape on the white motor lead. One final word of caution: If you use a Powerpole connector for both the battery and the motor, be sure to polarize them differently

so that the battery can *not* be plugged into the motor leads. Once this arrangement has been established, it can be made permanent by gluing the black and red connector shell together with instant glue. If you're replacing connectors, *be careful, and get help if needed!*

Good luck, and remember: Don't turn your car loose until the transmitter is turned on and working!

**Here are the addresses of the companies men-*

tioned in this article:

Panda; distributed by Global Hobbies, 18480 Bandelier Circle, Fountain Valley, CA 29708.
Sermos, Cedar Corners Station, Box 16787, Stamford, CT 06905.

FINE DESIGN RAIL

(Continued from page 73)

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(Continued on page 134)

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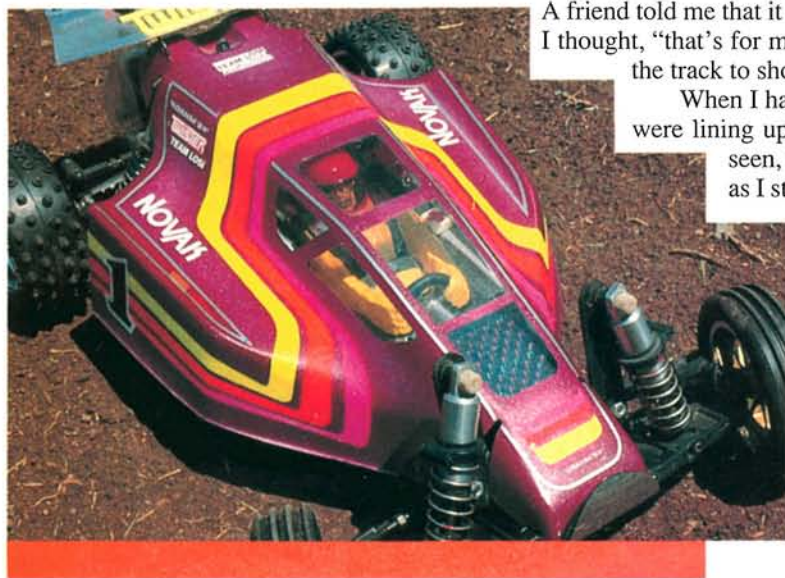
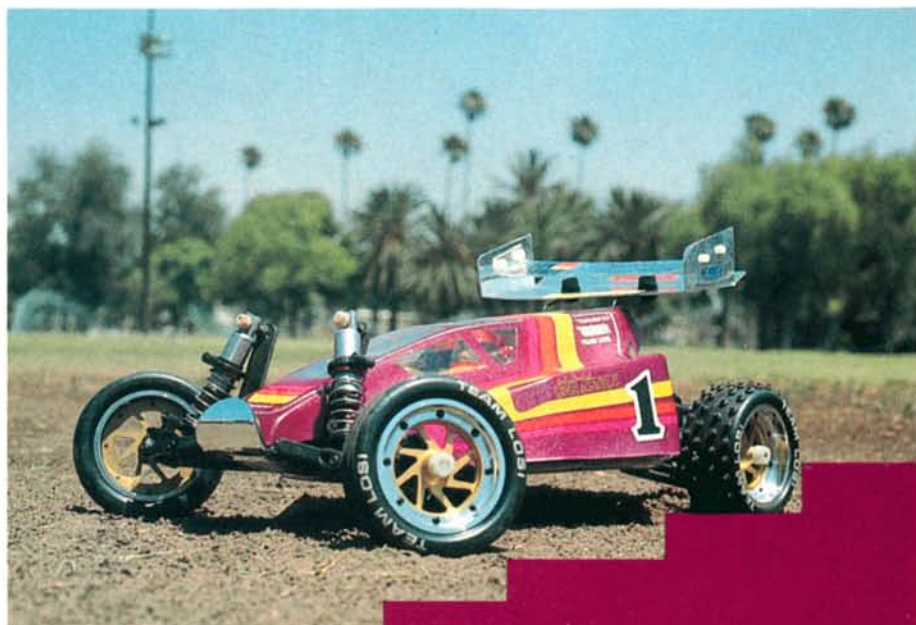
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WINNING

CONCOURS

by RICK HOULE

Secrets Behind a Show-Stopper



MY FIRST EXPERIENCE with concours competition came at the third annual CRP Challenge at Ranch Pit Shop in Pomona, CA, back in October '85. I was then a recent convert to R/C racing and was innocently ignorant of what was going on. I had just replaced the stock hard-plastic body on my modified Super Champ with a Lexan shell that I had painted with enamel model paint. I was quite proud of my handiwork and thought it was the hottest-looking race car around.

When I first heard the announcement telling Concours entrants to come up to the track for judging, I had to ask someone to explain just what the heck "Concours" meant. A friend told me that it was a contest for the best-looking car at the event. "Well," I thought, "that's for me," so I grabbed my hot little number and sauntered up to the track to show it off.

When I had worked my way through the crowd to where all the cars were lining up for the judges and saw the hottest-looking cars I'd ever seen, my heart sank. A twinge of embarrassment came over me as I stood there with my humble Super Champ at my side. These cars were absolutely breathtaking!

With head hung low, I slowly walked back to my pit making a silent vow that I'd one day win the honor of having the best-looking car at this annual event. Two years later, in '87, I painted an RC10 that was sharp enough to win first place at the fifth annual CRP challenge, and with the same body on a modified chassis, I won first again the following year at the sixth annual CRP. I learned that, even though a car's paint job is important, a few other factors are vital when it comes to winning a concours event.

As well as having a killer paint job, a car must be *clean*. How clean? How about absolutely immaculate!

Another major factor is having a driver at its controls. Any car with a driver will probably beat a car that doesn't have one. You must also have the latest equipment. Be prepared to spend a little extra on the latest wheels or the newest body, etc., and, finally, be *creative*. Spend extra time on adding pertinent details, both inside and out. To win, you must first get the attention of the judges; and the more details you add to your car, the better your chances of grabbing, and then holding, their attention.

For this article, I chose the Team Losi* JR-X2 as the basis of my concours project. I wanted to use a body shell that was very different from what most people were using, so I chose the Dahm's* Ultra body (part no. D120). I wanted the most awesome wheels I could find and chose the Tecnacraft* gold-spoke wheels (part no. 16-04-BB-G) made for the JR-X2. For the racing wing, I chose a chrome-coated Team Hammer* Multi-Element wing (part no. W02), which I'll tell you later how to coat.

The first order of business was a complete cleaning of the box-stock JR-X2 chassis. Shocks, radio gear and tranny were all removed, and each component was thoroughly cleaned and then re-installed. (Yes, judges often do look under the bodies at these parts.) The aluminum rims of the Tecnacraft wheels were polished to a silvery luster that really set off the gold-anodized spokes.

Painting your concours entry will undoubtedly be the most time-consuming part of the project. The finished shell should be in mint condition, so, to avoid scratches, set it on a soft cloth or towel while you work on it. After thoroughly cleaning the shell with good old-fashioned dish-washing liquid, rinse it, and dry it with a soft terry-cloth towel.

I completely coated the inside of the shell with a thick coat of Track Master* Spray Mask and then let it dry overnight. The mask can be applied with an airbrush or a bristle

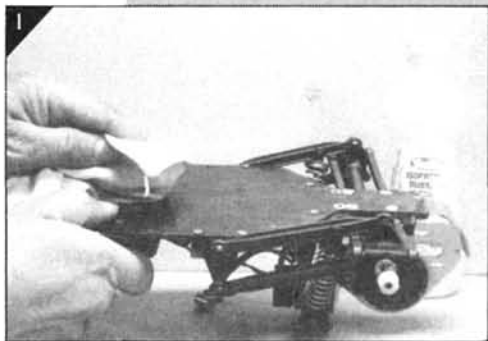
brush. The "sculptured" stripes were drawn on the outside of the shell with a china marker, which comes in red, black and yellow and can be easily rubbed off the Lexan without leaving a trace.

The liquid mask is easy to cut with an X-Acto blade, but be careful to avoid cutting too deeply into the Lexan. To get the crispest lines possible, always put a fresh blade in your hobby knife whenever you use it. The liquid mask allows you to make all your cuts for the graphics without the danger of the paints "bleeding" through the cuts. Always start with the darkest color, and peel the mask away to expose the section that you want to paint. Using an airbrush, I sprayed on a light coat of Pactra* Metal Flake, which was followed by a light coat of Parma* Metallic Burgundy. The airbrush nozzle was then set on "fine-line spray" and loaded with a Parma Deep Dark Burgundy. Following the body lines, this color was carefully sprayed into the corners and along the edges of the shell, and a final coat of Metallic Burgundy topped this off. The three fluorescent stripes (yellow, orange and pink) were sprayed on using the darkest-color-first method. When all the colors were on, the inside of the shell was entirely undercoated with Parma Indy Silver to bring out the luster of the fluorescent colors.

It's wise to use some form of respirator whenever you use these paints, because the ingredients of polycarbonate paints are rough on one's respiratory system.

The Dahm's racing shell didn't have enough window space for my driver to see adequately where he was going, but the liquid mask made it easy to add a few extra window panels.

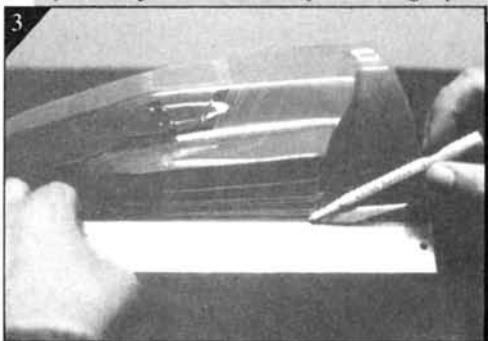
Next on the agenda was the driver. You can either use the vacu-formed Lexan figures, or raid your collection, if you have one. The Lexan driver of this car also drove my CRP winner, but I added a few more details, e.g., the fire extinguisher from a plastic



1 Having a clean chassis really impresses the judges.



2 Track Master Spray Mask is applied to the inside of the body. There's no need for masking tape.

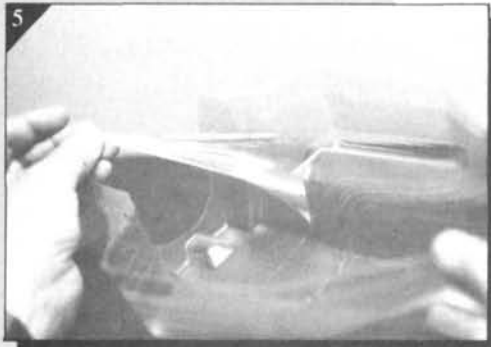


3 "Sculptured" lines are drawn on the outside of the body using a china marker. The lines are then etched into the spray mask to be removed later.

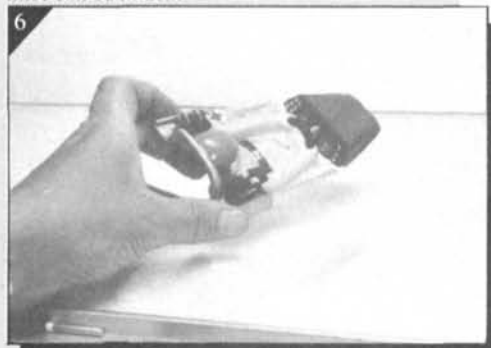


4 An airbrush is used to apply the paint.

model dragster kit. I fashioned a mini-cam out of an Associated* servo block with a nylon Allen-head screw for a lense; this was painted black and mounted with servo tape. I cut out a tachometer and oil-pressure gauge from an instrument advertisement I found in a hot-rod magazine and then taped them under the dashboard. I raided the dragster model again: Its chrome lug nuts were used for dashboard switches.



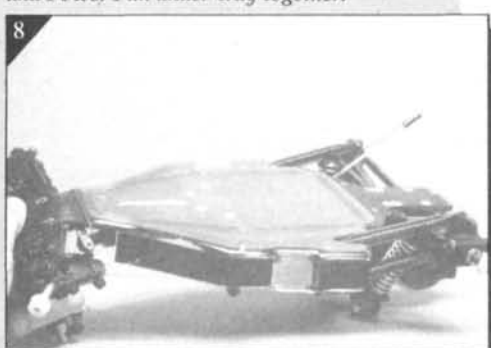
5 The spray mask is removed so that the detail lines can be added.



6 A concours-winning driver figure! The judges really look for cockpit detail.



7 Velcro is used to keep the Dahm's Ultra body and Power Pan under-tray together.



8 Thin strips of double-sided servo tape hold the Power Pan to the chassis.

The face shield on the driver's helmet was left clear, and the face of a small rubber "Skelitor" figure was cut out and glued inside it with a rubbery household adhesive called "Goop." Special trim like Dahm's Instant Window Tint and Laserfire self-adhesive panels add an extra touch of class to the finished vehicle. Dahm's suggests that you apply the Window Tint (part no. 810) to the *outside* of the windows, but I put it on the *inside* of the top panel. The Laserfire (part no. D212) comes in both tape and sheets and resembles spun aluminum. I used it on top of the instrument panel, and it really sets off the cockpit nicely. I made a first-aid kit out of white nylon plastic and used red pin-striping tape to make the cross.

Custom lettering is easily done with Letraset, which is a graphic arts rub-on lettering product. Using an onion-skin-like tracing paper, the letters are rubbed on with a tool called a "burnisher." A clear cellophane tape (e.g., address-label protection tape) is then laid on top of the letters. Using the burnishing tool, carefully rub the letters so that they'll stick to the tape. Next, trim around the letters with an X-Acto knife and slowly lift off the tracing paper with tweezers. You now have a custom-made decal that can be applied anywhere on your car, and this is a great way to put your name or any other message ("Eat My Dust"; "The Ayatollah Rules"—you think of something!) on your car.

With the hardest work out of the way, it's now time to put everything together. The Dahm's Power Pan (part no. D145) was attached to the underside of the JR-X2 chassis with thin strips of Revtech double-sided servo tape. I left the pan clear so that the judges could see inside the car.

Strips of 3/4-inch hardware-store Velcro were used to hold the body on

the Power Pan. Stock JR-X2 rubber tires were pulled onto the Tecnacraft wheels, and the raised letters were painted white with a Pentel paint pen from an art-supply store.

The Team Hammer wing was covered with Chrome-Cote, which is a product that's usually used by R/C airplane builders. It can be applied to the top or the underside of the Lexan, and when it's finished, it looks like real chrome or polished aluminum and is fairly durable. (*Editor's Note: If you're preparing an on-road wing, be sure that the rules don't require a clear wing.*)

The driver and cockpit section were applied to the inside of the shell with servo tape. For that scale look, I didn't cut out the antenna hole; I disconnected the antenna from its mount and simply laid it down inside the chassis for judging. For racing, you can always drill a hole in the body later, at your pit. As a final touch, I polished the body with Team Hammer Dura-Shield.

So how does it look? Just look at the photos to find out. It was definitely good enough for the judges at the Mickey Thompson race in Pasadena and the NORRCA series races, as it won *both* events, and I plan to win many more. How's *that* for confidence!

*Here are the addresses of the companies mentioned in this article:

Team Losi, 1655 E. Mission Blvd., Pomona, CA 91766.

Dahm's, P.O. Box 360, Cotati, CA 94931.

Tecnacraft, 1335B Dayton St., Salinas, CA 93901.

Team Hammer, 903 E. Francis, Corona, CA 91719.

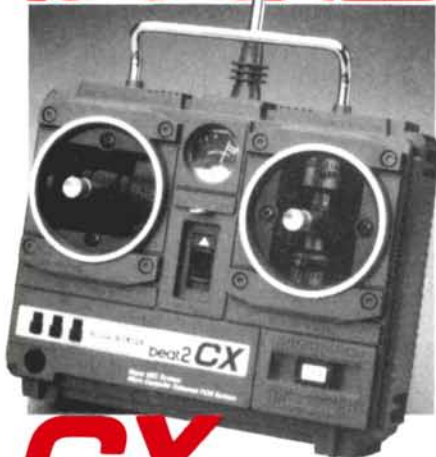
TrackMaster Mfg., 1466 Pioneerway, Suite 10, El Cajon, CA 92020.

Pactra (Plasti-Kote), 410 N. Michigan Ave., Rm. 1280, Chicago, IL 60611.

Parma International Inc., 13927 Progress Pkwy., North Royalton, OH 44133.

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FINE DESIGN RAIL

(Continued from page 128)

any.

Imagine the whole thing topped off with a scale body that seems to go on forever, and you might have a better idea of what I've got myself into. I'm now the proud owner of a lightning bolt with a 24-inch wheelbase.

ASSEMBLY: Sorry to disappoint you, but the Streamliner Rail comes fully assembled and packed with wheel and axle bearings. You only have to work on the wing. Fine Design packages wing wire, mounts and a thin, rectangular piece of graphite that you slice and dice into a rear wing. That sounds a lot more difficult than it is: The graphite can be cut quite easily with Lexan scissors, and my only concession to caution was to cover both sides of


the panel with masking tape to prevent splintering. (It's also much easier to draw on light-colored masking tape than on black graphite.) The longest delay is the 5-minute wait while the epoxy that holds the wing parts together dries. After that, you just slip in the wire and slide the assembly into the mounts.

The Streamliner has a very realistic body that's complete with an engine hump that towers over the back of the driver's cockpit. For even more realism, Fine Design includes separate instructions for cutting and repositioning two of the existing body panels, and with its headers and some creative work with 22-gauge color wire, you can come up with great detailing.


The only true assembly steps involve

(Continued on page 136)

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FINE DESIGN RAIL

(Continued from page 134)

the electrics. I mounted a Futaba* S132H servo, a Novak* receiver and a PDI* drag speed controller. My first choice for mo-

tive force was an Astro Flight* FAI motor, but after I had ground down the shaft to accept standard pinion gears (the motor's usual domain is the air), I found that the motor needed more back-to-front clearance than the motor pod allowed.

Although I could have sawn off a little of the side pod to make it fit, I didn't want to risk changing any of the dragster's dynamics for this review. (Don't fret: Astro Flight builds its motors to last for years, and I've come up with an engine pod in a semi-scratch-built Pro-Stock car that will cuddle the FAI motor in good form. It might even make the pages of *Car Action*!) In its place went a Black Magic* 13-turn motor.

I did make a slight change to the gearing. The Streamliner arrived with a 54-tooth, 32-pitch spur gear, and the choice of pinion is left to the owner. Fine Design's rationale is that if you use the car in the street for your first few outings, you really don't want it to go crazy until you're used to it. I'm already crazy, so I ordered an 85-tooth, 48-pitch, machined Delrin spur gear and a companion 48-pitch, 15-tooth pinion. The change from 32- to 48-pitch will take some of the play out of the gears. Molded spurs are a less expensive alternative, but when you hit the brakes at the end of your run, you're more likely to strip teeth from a molded gear than from one that has been machined.

PERFORMANCE: I charged up the

(Continued on page 152)

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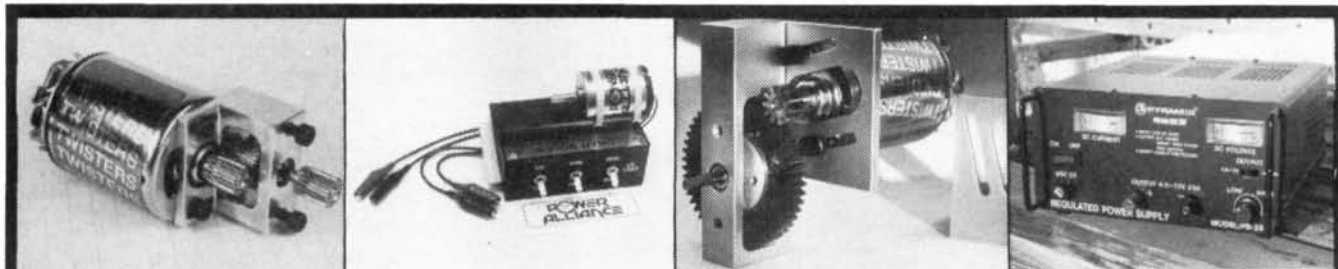
FINE DESIGN RAIL

(Continued from page 136)

10-cell, 2/3 sub-C SCR pack and handed the rail and a Futaba Magnum Junior over to Jaime Colon, who's a Fine Design driver. He staged, counted down the tree and hit the trigger. The car fired off the line, glitched about two thirds of the way down the track, smacked the side of the lane and danced into the wall some 230 feet from the starting line. Some time between when I set up the car and when it hit the wall, I'd lost the brakes!

We retrieved the beast and were disappointed to find that the front end now hung at a different angle; in fact, half of the front section of the chassis plate stuck up like a jagged rock and exposed the foam core. We didn't have a replacement chassis, and that usually would have been the end of things; but, if nothing else, drag racing is an exercise in ingenuity. I had some Satellite City* UFO in my bag, and one of the claims made for this version of CA is that it doesn't attack foam. I had nothing to lose, so I spilled some on, clamped the graphite into place and let it sit. About 20 minutes later, the clamps came off and, while the chassis wasn't a pretty sight, it looked sound. That was good enough. I also pulled another radio

(Continued on page 154)



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Patent Disclosure Document Submitted

FINE DESIGN RAIL

(Continued from page 152)

out of my bag.

That was Jaime's third crash of the day, so he relinquished his position as driver. (Crash your own car, and it's OK; crash someone else's car, and you feel incredibly guilty—even if it wasn't your fault.)

Chris Fine and Rich Roth (who's also from Fine Design) persuaded me to drive.

I'll be the first to admit that I'm not a bad driver. If you were to yell "Ready; set; go!" I'd get away from the line in relatively good order and get a straight run; but things are totally different the first time you come face to face with that Christmas tree! There I stood, watching

the red lights jog down the pole, all the while reminding myself that when it gets to green I should go. So the lights went *red, red, red, green*, and I thought, "Red, red, red, green"—green?! Hit the trigger, you fool!

My reaction time for that pass was .451, which is just a little faster than an aspara-

(Continued on page 156)

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FINE DESIGN RAIL

(Continued from page 154)

gus can react under similar conditions, but the Streamliner didn't really need my help. Despite my poor reaction time, it managed the scale quarter mile in 2.579 seconds at 51mph. I took it back to the line without topping off the battery pack

and did another pass. My reaction time improved to .319 (still nothing to write home about), and the rail marched down the track to the tune of 2.576 seconds at 49mph.

I went back to the line again and launched it. Somewhere around the 60-foot mark, I did a Jaime Colon and lost the rail into the center divider, twisting the

chassis until the graphite split again. It was a good time to stop for the day. The broken chassis really wasn't a problem, because Fine Design has a lifetime warranty on its chassis, and a new one arrived at my house a few days later.

What's Next?

The 2.57-second runs are respectable, but

(Continued on page 158)



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FINE DESIGN RAIL

(Continued from page 156)

not great. It will take a little tuning to get my rail into competitive form (remember, it went from the box to the track), but drag racing is more science than muscle. You spend time adjusting the spur-gear and

pinion-gear combinations, the front-wheel caster, the wing attack angle—even the way you charge your batteries will affect your car's performance.

That's where the Fine Design manual comes in handy. With little assembly to be done on the car, most of the manual discusses the things that will affect per-

formance. With its highly detailed body and optional headers, the Streamliner tips the scales at 2.65 pounds—just over the 2.50-pound weight minimum. To reduce the weight, I'll switch from the stock body to one of the nearly featureless BoLINK* drag bodies. After that—well, they did top

(Continued on page 160)

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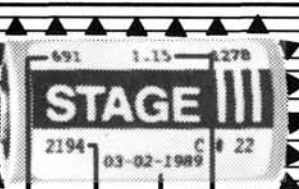


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FINE DESIGN RAIL

(Continued from page 158)

74mph a few months ago. At least I have something to aim for!

*Here are the addresses of the companies mentioned in this article:

Fine Design Manufacturing, 2 North St., Middletown, NY 10940.

Futaba, 4 Studebaker, Irvine, CA 92718.

Novak Electronics, 128-C East Dyer Rd., Santa Ana, CA 92707.

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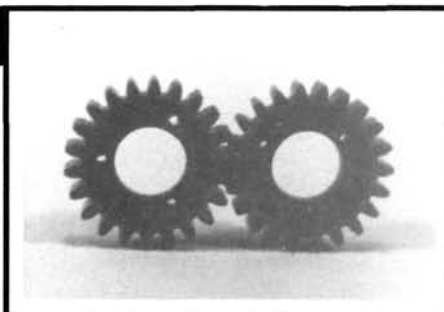
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BUDGET RACER

(Continued from page 79)

but not so well for off-road racing. I did make a temporary fix by removing the brass bushings from the lower end of the shocks and by tightening down on the nut and bolt. Additional friction can be developed, which helps a lot. For serious off-road racing, oil-filled shocks are a must.

The Crusher comes with an 8-tooth pinion, which, when coupled with the outside tires and wheels, produces a reasonable top speed, but when a smaller set of tires and wheels is used, there's a defi-

(Continued on page 162)

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BUDGET RACER

(Continued from page 160)

nite lack of top end. Fortunately, other pinions are available, and I'm going to try the 13-tooth and the 15-tooth.

The Advance Engineering wheels aren't vented, so I drilled a 1/16-inch vent hole in each one. This lets the tires flex better, which improves the ride and handling by allowing some air to escape.

Much of the handling in heavy metal is tire flex, so if you're having a problem, try experimenting with softer or harder tires.

One of the major problems with any heavy metal truck is the weight of its tires and wheels. Have you noticed how modified trucks using RC10, Optima, JR-X2, etc., chassis don't handle as well as these cars usually do in their regular race classes? Vehicle weight contributes to this, but an even more serious problem is the weight (mass) of the tires and wheels. Visualize swinging a bowling ball. As it reaches the top of your back swing and starts down, try to stop it and hold it up there. Unless your knuckles drag on the ground when you walk, it's pretty tough to do. If you substitute a softball for the bowling ball, however, it's easy. The same notion holds true with suspension. The shock and spring have a lot more trouble handling a heavy tire and wheel than they do handling a light tire and wheel.

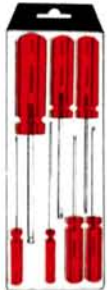
As in all racing applications, lighten the car whenever you can. The Crusher tips the scales at a healthy 5 pounds, so this baby has got to go on a diet. Everything superfluous must come off. I can't stress

(Continued on page 164)

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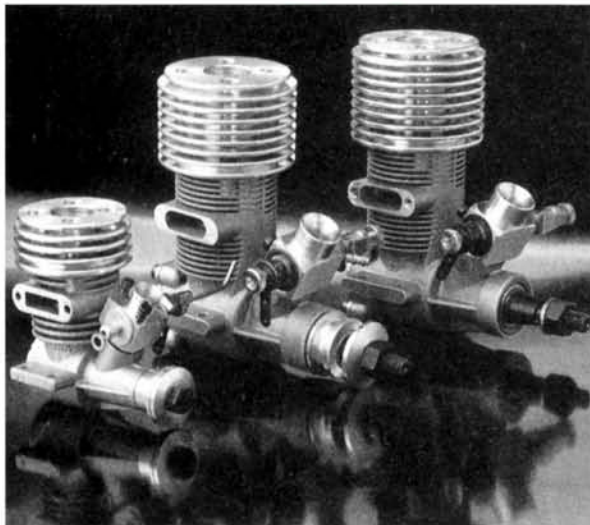
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MINIATURE MUSCLE

Three new additions to the Webra engine line up for 1989 include the Sport .10, Speed .20 ABC and Speed .28 ABC Car and Buggy engines for 1/10th and 1/8th scale cars. The Sport .10 is a great choice for those who want to get their feet wet in gas powered, on or off road. The Speed .20 and .28 are breaking new ground and turning heads with their high torque, incredible power, maintenance free operation and unsurpassed performance.

#WE1006CAR Sport .10 Car/Buggy

#WE1018CAR Speed .20 ABC Car/Buggy

#WE1029RCB Speed .28 ABC Buggy

Webra Engine	Output HP	RPM-Range RPM/mon.	Displacement ccm	Bore mm	Stroke mm	Weight oz
.10 Sport	.30	2500-17000	1.6	13.0	12.0	3.46
.10 Speedy	.50	2500-24000	2.0	14.2	12.5	4.76
.20 Speed ABC	.95	2500-18000	3.42	16.5	16.0	7.58

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BUDGET RACER

(Continued from page 162)

enough the importance of getting your race car as light as possible, as every unnecessary ounce slows it down. How

much should you pare off? Get right down to the class minimum or below, if you can. Then, to reach the legal specification, add weight where it works best. Always run a legal car. People who cheat aren't smart,

they're just saying, "I'm not good enough to win without an unfair advantage."

In the next issue, I'll detail the modifications I've made to the Crusher and give you the race results—even if they're embarrassing.

See you at the track.

*Here are the addresses of the companies mentioned in this article:

Royal Products Corp., 790 West Tennessee Ave., Denver, CO 80223.

MRC Tamiya, 200 Carter Dr., P.O. Box 267, Edison, NJ 08818.

Aerotrend, 31 Nichols St., Ansonia, CT 06401.

Advance Engineering, P.O. Box 766, Woodland Park, CO 80866.

DELTA VILLAIN

(Continued from page 96)

how well a cement or asphalt track has been laid, there are almost always small dips, bumps, or cracks in the surface, but that's life on the racing circuit. With this in mind, I readjusted the rear spring to a looser setting.

After a quick pit stop to adjust the suspension and switch to the new Twinn-K* Black Dot tires, I was off. The Villain performed extremely well, needing only some minor diff adjustments to be totally dialed-in. It was very lively and seemed

(Continued on page 174)

OFF-ROAD RACER!

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RCW 02

Please send me my new NEON design(s). I have enclosed \$14.00 per T-shirt or \$21.00 per sweatshirt, postage and handling are included in that price.

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- 7084 - Nylon Nuts 8-32 or 4mm (8 pcs)
- 7088 - Body-Post Hole Punch
- 7100 - Opt. Mid-Blackfoot Adapter Set
- 7150 - Ultima-Blackfoot Rear Adapter Set
- 7200 - Traxxas Bullet Chassis Brace
- 7220 - Traxxas Bullet Front Arms - Lt. Wt.
- 7225 - Traxxas Bullet Rear Arms - Lt. Wt.
- 7230 - Traxxas Bullet Arms Set (4) - Lt. Wt.
- 7340 - JR-X2 Front Arms (Strong)
- 7345 - JR-X2 Rear "Arm" Conversion Kit
- 7900 - Ladder Chain Sprocket 19T x 5mm
- 7910 - Ladder Chain Sprocket 18T x 5mm

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Cheetah Racing

QC/DC

BATTERY SYSTEM

by ERIC GOLDSCHRAFE

TENTH-SCALE ELECTRIC car racing has progressed through many stages, with a steady improvement in car design and performance as a result. One of the latest trends, superspeedway, or enduro, racing has seen several companies and individuals scramble to produce devices that allow rapid battery-

pack changes. These "pit wars" have resulted in several quick-change systems that work well, but if you're looking for improved reliability along with that speed, the Cheetah Racing* QC/DC (Quick Connect/Disconnect) battery system is the one for you.

The Cheetah QC/DC system eliminates a lot of the battery wiring, and what's left may be securely fastened to the chassis to alleviate problems caused by wire movement and vibration, both of which cause so many DNFs. The battery pack itself

becomes a bulletproof module that also enhances "maintainability."

Developed to promote fast pit stops, this device has been proven successful at such well-known tracks as the Thunderdrome and Lake Whippoorwill. By mounting the Ni-Cds on a plate with a latch and plug arrangement on one end and incorporating a quick-release mechanism and another set of contacts mounted into the chassis plate, it's a snap to pop out the spent battery pack and insert a fresh one without removing the body. A button on top of the quick-release block disengages the positive locking device and allows the battery plate to be removed and the replacement installed from underneath the edge of the body in less than 3 seconds!



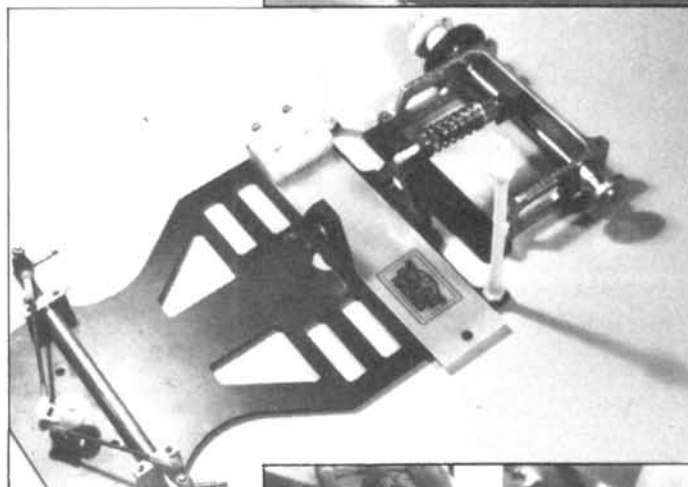
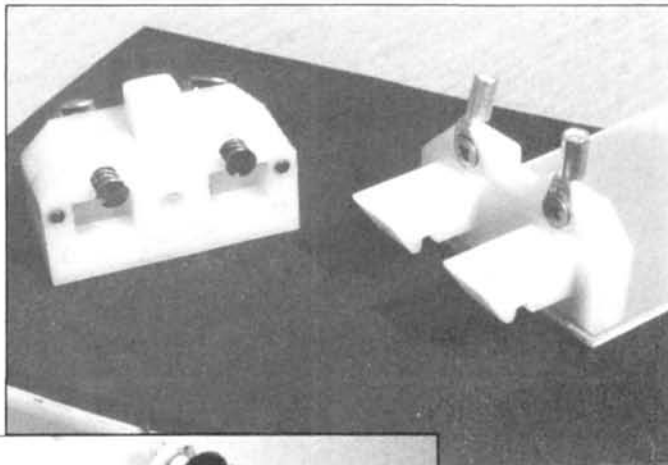
CUTTING PIT TIMES
WITH A QUICK-CHANGE
BATTERY PACK ■ ■ ■

The Ni-Cds and one half of the power connector are solidly mounted on a fiberglass plate, so there are no wires flopping around and waiting for a chance to break. The other half of the connector is bolted to the chassis and forms the latching/release mechanism. The wiring to the speed controller is now permanent and can be securely tied down to the chassis to prevent breakage—reason enough to install one of these in your racer, even if you don't run enduros. You'll save on tape, too!

The QC/DC system was designed to fit the McAllister* Outlaw chassis, where it mounts across the rear of the main plate and over the T-plate. It will also fit other chassis, as long as there's a 6³/₄ x 1³/₄-inch flat area in the right place on the intended chassis. If it won't fit across and you run oval races, consider mounting it lengthwise on the left side of the chassis, similar to the BoLINK* LTO car. To mount, simply drill two holes through the chassis to accept the screws that hold the latch mechanism in place. On the McAllister chassis, a tab on the bottom of the battery plate engages the chassis on the opposite side from the latch. You may have to cut or file a notch into a different chassis to accept this tab, but this is easily accomplished. When soldering the wires to the latch block and the battery plates, Cheetah suggests that you take the lugs off the plastic pieces to avoid heat damage to those parts, and advises that you double-check battery polarity hookups as you proceed. The Ni-Cds are glued and/or taped securely to the battery plate (two plates are provided in the kit) and then hooked up to the terminals; they can be installed end-to-end or side-by-side.

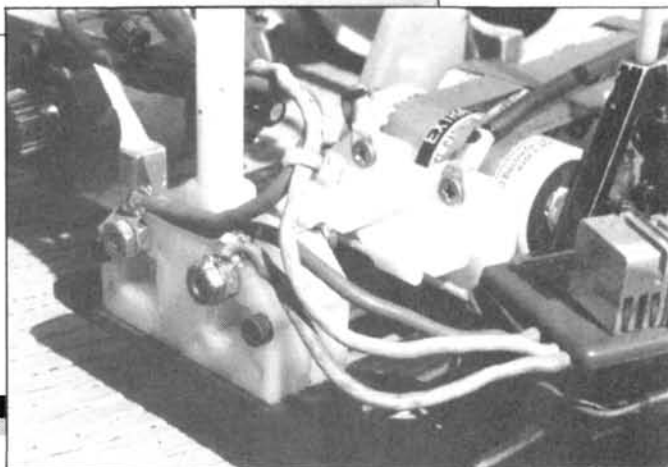
Once properly installed, there's practically no way this device can fail. It's well-made and snaps together securely. You will, however, have to devise a new way to charge the battery packs, such as with

Shown here are the main components of the QC/DC battery system. The block on the left bolts to the chassis, while the block and fiberglass plate on the left harness the 6- or 7-cell pack.



Installed in the McAllister Outlaw, the QC/DC system fits between the two T-plate mounts, and this provides good front to rear balance and weight distribution.

Completely assembled, the two screws on the battery portion of the system act as contacts that connect with spring-loaded contacts when the two halves are joined.



a pair of alligator clip-leads, which are available at any electronics supply store. Sound interesting? See your hobby dealer or contact Cheetah Racing for more information (Part No. 2017, kit; 2018, extra trays).

**Here are the addresses of the companies mentioned in this article:*
Cheetah Racing, 10823 Amestoy Ave., Granada Hills, CA 91344.
McAllister Racing, 2205 First St., Unit 107, Simi Valley, CA 93605.
BoLINK R/C Cars, Inc., 420 Hosea Rd., Lawrenceville, GA 30245.

WHAT'S NEW



ZAP TOTAL ADHESIVE SYSTEM

The 1990 Zap instructional booklet/catalog is now available directly to consumers. This 4-page presentation not only identifies each product of the Total Adhesive System, but explains how and when each Zap variant is best used. Whether you're interested in aircraft, boats, cars, or helicopters, there's something here for you. To receive a free copy of this full-color publication, simply send a large SASE to the Zap regional sales office nearest you.

For more information, contact House of Balsa, 20130 State Rd., Cerritos, CA 90701; Robart, 310 North 5th St., St. Charles, IL 60174; or Frank Tiano Enterprises, 2460 S.W. 85th Terrace, Davie, FL 33324.



MCALLISTER RACING ROADRUNNER

The Roadrunner 1/10-scale off-road single-seater body fits very well on the RC10 and JR-X2. This is a McAllister Racing original design, not a rip-off of a stock body. A great combination of sleek aerodynamic shapes accommodates shock towers and chassis pans.

Part No. B120. Price: \$19.

For more information, contact McAllister Racing Inc., 2245 First Street, Unit 105, Simi Valley, CA 93065.



TEAM ASSOCIATED RC10L ON-ROAD RACER

Team Associated's new RC10L 1/10-scale on-road racer is already winning big. It's the new 1989 ROAR National 1/10-scale On-Road Champion; it's a Whippoowill Champion; and it holds the track record at the Los Angeles Velodrome at 56.5mph! The RC10L is designed similarly to Associated's two-time IFMAR World Champion RC12L, another proven winner. The RC10L is very easy to drive for all racers, and the kit is easily assembled, thanks to the easy-to-understand instruction manual that's packed with photos to illustrate each step. A complete line of spare parts, bodies, motors and batteries is readily available. Kits are complete and include ball bearings, but body, motor, batteries, radio, or electronics are not included.

Basic Fiberglass Kit: Part No. 8001. Price: \$170.

Basic Graphite Kit: Part No. 8002. Price: \$235.

For more information, contact Associated Electrics, Inc., 3585 Cadillac Ave., Costa Mesa, CA 92626.



DAHM'S DIRT DANCER

Dahm's newest racing body, the Dirt Dancer, is designed for both style and performance. The Dirt Dancer is the ultimate body design for the Ultima, the Turbo Ultima, the Ultima Pro and the Maxxum. Available painted or in clear Lexan, its low, smooth, unique design also fits most other 2WD off-

road cars. Shown on the Ultima Pro with the Dirt Dancer Power Pan, the body features a rear spoiler and three vents that can be cut out for increased cooling.

Price: \$29.95, painted; \$17.98, clear.

For more information, contact Dahm's, P.O. Box 360, Cotati, CA 94931-0360.



JR 950B SPEED CONTROLLER

The JR 950B Speed Controller with reverse is a state-of-the-art, competition speed control that offers better performance and increased reliability. Its power Mosfet provides full voltage with almost no voltage loss from the Ni-Cds to the motor. The 950B fits in a standard servo mount, has no relay reverse system, and has overload protection. It features a new RF switching system for smoother motor control, forward and reverse monitor LED, forward and reverse high-point monitor LED for setup adjust, and a built-in heat sink. Its voltage regulator supplies power to the receiver and servos. A separate receiver battery isn't necessary, but one can be used. The 950B has a built-in battery-eliminator circuit to power the receiver and servos from the car's main batteries. Technical data: FET control system, 7.2V-9.6V (without reverse); continuous current: 25 amps/forward; surge current, 720 amps/forward; residual resistance, 0.01/forward.

Part No. JRA950B. Price: \$124.99.

For more information, contact Hobby Dynamics, 4105 Fieldstone, Champaign, IL 61821.

Descriptions of new products appearing on these pages were derived from press releases supplied by the manufacturers and/or their advertising agencies. The information given here does not constitute endorsement by **Radio Control Car Action**, nor guarantee product performance or safety. When writing to the manufacturer about any product described here, be sure to mention that you read about it in **Radio Control Car Action**.



CRP BEARING CLEANER

Cleaning ball bearings and metal parts with CRP's bearing cleaner increases their life considerably and enhances performance. Bearing cleaner comes in a 10-ounce container.

Part No. 2119. Price: \$6.99.

For more information, contact Custom Racing Products, 3250 El Camino Real #B3, Atascadero, CA 93422.



SEES MACHINE KYOSHO TRUCK WHEELS

Sees now has lightweight, one-piece, directionally spoked, aluminum wheels for Kyosho trucks, like the Big Brute, the Double Dare, the Hi-Rider Vette and the new Big Boss. Precision-machined, they're perfectly round, balanced and extra lightweight, so they run well and look great. Sees' Kyosho wheels with holes are also available.

Part No. SEE 3405, fronts; SEE 3415, rears. Price: \$64.95.

Part No. SEE 3400, Kyosho fronts, SEE 3410, Kyosho rears. Price: \$64.95.

For more information, contact Horizon Hobby Distributors, Inc., 3102 Clark Rd., P.O. Box 6029, Champaign, IL 61821.



PARMA 48-PITCH STEEL PINIONS

Parma announces the introduction of its 48-pitch steel pinions. Because these pinions are precision-machined, they run considerably smoother and cause less wear on the spur gears, which will result in longer run times and faster top speed.

Price: \$4.50 each.

For more information, contact Parma International, 13927 Progress Pkwy., North Royalton, OH 44133.



TECNACRAFT 1/4-SCALE WHEELS

Tecnacraft introduces new, three-piece, true, modular aluminum wheels for most 1/4-scale cars. Manufactured on precision CNC machines to exacting tolerances, Tecnacraft modular aluminum wheels are available with centers in a choice of spoke patterns and optional gold-anodizing. Enjoy the advantage of choosing spoke patterns and colors to individualize your 1/4-scale car. Whether you race, show, or just take pride in your car's appearance, get exactly what you request.

Price per set of four: \$249.95.

For more information, contact Tecnacraft, 1335-B Dayton St., Salinas, CA 93901.

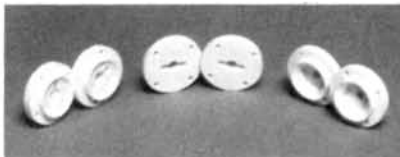


KYOSHO ZR-1 CORVETTE

The only American-made exotic sports car, the ZR-1, is now available in a 1/10-scale gas-powered model from Kyosho. This hot-looking on-road car features 4W independent suspension with large-capacity, oil-filled shocks that provide excellent handling. An O.S. CZ-R .12-size engine with a handy recoil starter makes the ZR-1 Corvette as easy to operate as most electric cars. All you need is fuel, transmitter and glow-plug batteries to enjoy the freedom not common with electric cars. The gearbox is enclosed to keep out dirt and rocks, and it features a smooth-action gear differential. A 2-channel radio is required for operation.

Part No. KK1644. Price with O.S. CZ-R engine: \$359.95.

For more information, contact Great Planes, P.O. Box 4021, Champaign, IL 61820.



TWINN-K BBS NYLON RIM ADAPTERS

New nylon adapters convert Twinn-K's BBS rims to fit the RC10, and Tamiya and Kyosho cars. They're strong, durable and economical.

BBS to RC10, Part No. 0177; BBS to Tamiya, Part No. 0178; BBS to Kyosho, Part No. 0179. Price per pair: \$3.95.

For more information, contact Twinn-K Inc., P.O. Box 31228, Indianapolis, IN 46231.

WHAT'S NEW



ADVANCED RACING CENTER STEERING KIT

Center-point steering is a hot item in on-road racing, and Advanced Racing Technologies now offers these assemblies in both 1/10- and 1/12-scale for all cars. Center-point steering gives your front end the right Ackermann geometry for the most precise steering possible. Get the edge in handling with Advanced Racing Technologies' center-point steering kit.

Part No. 2056, 1/10 scale; 2097, 1/12 scale. Price: \$10.

For more information, contact Advanced Racing Technologies, 460 Cypress Lane, Suite F, El Cajon, CA 92020.

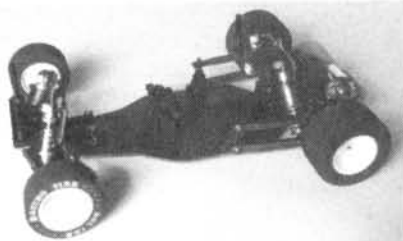


AEROTREND END CAPS

Aerotrend's end caps are made of high-density nylon, so they're perfect for hobbyists who make and repair their own battery packs. When used with battery-pack shrinkwrap, these caps prevent the batteries from becoming contaminated by dirt and other debris that can be picked up at the track by batteries without end caps.

Part No. 3928. Price: \$.99.

For more information, contact Aerotrend, 31 Nichols St., Ansonia, CT 06401-1106.



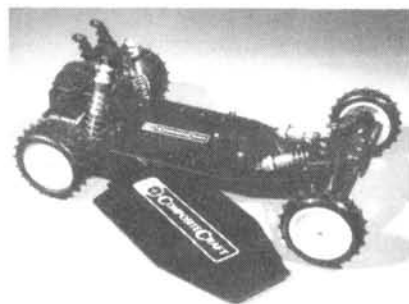
BOLINK JR-X2 PARTS

BoLINK's new body-mount kit for the Losi JR-X2 allows you to adapt its oval-type bodies for dirt or pavement racing. For oval- and flat-track racing, the lowering kit brings the chassis down closer to the ground.

Part No. BL-5290, JR-X2 Body Mount Kit. Price: \$17.95.

Part No. BL-5291, JR-X 2 Lowering Kit. Price: \$26.95.

For more information, contact BoLINK R/C Cars, Inc., 420 Hosea Road, Lawrenceville, GA 30245.

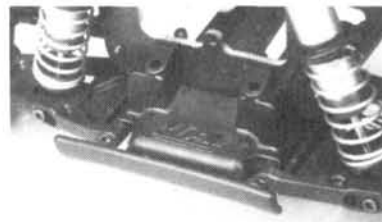


COMPOSITECRAFT TOP CAT CHASSIS

This new Schumacher Top Cat chassis from CompositeCraft replaces the stock aluminum tub. The lightweight graphite chassis is stronger than aluminum, and, unlike the aluminum, the graphite will return to its original configuration after taking a hard hit.

Part No. 10059. Price: \$55.95.

For more information, contact CompositeCraft, Inc., 2400 Sand Lake Rd., Orlando, FL 32809.

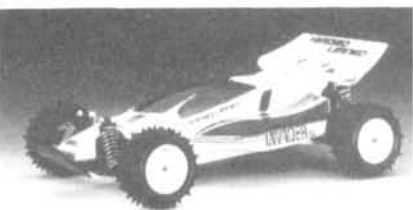


TEAM LOSI MINI BUMPER KIT

The new Mini Bumper Kit for the JR-X2 offers protection and performance. This compact, injection-molded bumper protects the bulkhead and inner pin location on the JR-X2, and it also includes spacers, hardware and instructions to actually increase its responsiveness. Designed by world champion Gil Losi Jr., this new bumper will enhance the performance and reliability of your JR-X2.

Part No. A-4005. Price: \$4.95.

For more information, contact Team Losi Inc., 1655 E. Mission Blvd., Pomona, CA 91766.



HIROBO INVADER 4WD

The Invader has many of the same features as the popular Hirobo Alien Mid SS, including mid-engine, belt drive, 14 ball bearings and rugged design. Its oversize shocks add 70 percent more shock absorption than the competition. A two-piece Lexan body keeps the dirt off of the internal components and has an attractive aerodynamic design. The chassis is built-up from gold anodized aluminum. This is a good all-around kit for anyone interested in 4WD.

Part No. HIRC1001.

Price: \$259.99.

For more information, contact Hobby Dynamics, 4105 Fieldstone, Champaign, IL 61821.

Descriptions of new products appearing on these pages were derived from press releases supplied by the manufacturers and/or their advertising agencies. The information given here does not constitute endorsement by **Radio Control Car Action**, nor guarantee product performance or safety. When writing to the manufacturer about any product described here, be sure to mention that you read about it in **Radio Control Car Action**.

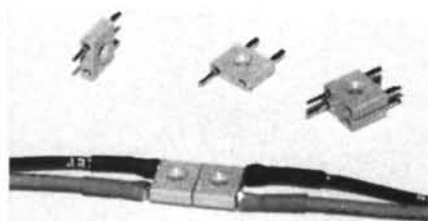


NERON ASSOCIATES DYNA-METER II

Here's the Dyna-Meter you've been asking for: the Dyna-Meter II. Like the original Dyna-Meter, the Dyna-Meter II has an analog scale to record peak performance; it identifies the top-performing motor through the drive train; it checks the condition of the motor brushes; it can be used to adjust pinion-gear tension and to fine-tune your electronic speed control. It also has a 90-day warranty. Now the Dyna-Meter II has even more! Sensitivity control allows direct readings from your motor and the selection of the best motor for your car. Increased sensitivity handles readings for even the hottest modified setup.

Price: \$49.95.

For more information, contact Neron Associates, P.O. Box 348, Germantown, MD 20874.



BOLD CREATIONS POWERPIPE CONNECTORS

A totally new connector system for electric R/C cars and boats, the PowerPipe Connector has many features for the serious competitor. Small and rugged, it has been proven in R/C car-racing competition. Designed to connect the speed control to the battery and to the motor, its unique design prevents reverse plugging that can destroy expensive electronic components. The

gold-plated, machined pins mean no power loss even after hundreds of insertions. They're easily stacked to carry the extreme current of supermodified motors. Best of all, they're economical: Owing to PowerPipe's unique design, there's no need to buy pairs, only the half needed to do the job!

Available singly (Part No. BC001. Price: \$1.85), or in packages of five (Part No. BC004. Price: \$7.50).

For more information, contact Bold Creations, 1305 Abbey Rd., Round Rock, TX 78681.

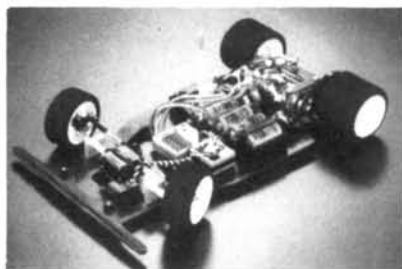


UNGAR SOLDERING EQUIPMENT

To get a good solder joint, you need quality soldering equipment, and Ungar makes a complete line of soldering devices to fill any need. These top-of-the-line soldering stations have unsurpassed features. The Race Station and Super Race Station both have exclusive thermal thrust tips that make them perfect for hobby uses. They have adjustable temperature ranges, from a mild 400 degrees Fahrenheit for fine work, to a blistering 800 degrees Fahrenheit for heavy-duty battery-pack assembly. Both units have electronic temperature control that varies the power going to the tip and maintains the desired setting. The handy base units contain an iron holder to keep the tip clean for perfect solder joints.

Price: Race Station, \$109.95; Super Race Station, \$119.95.

For more information, contact Horizon Hobby Distributors, Inc., 3102 Clark Rd., P.O. Box 6029, Champaign, IL 61821.



HYPERDRIVE HYPER 10

The record-breaking ride of 14-time national champion Ralph Burch Jr. is the fastest 1/10-scale straight-axle car in the world. For incredible performance on high-speed ovals and roadcourses, it features unique ball-jointed triple-shock rear suspension, Hyperdrive belt system, Hypertorque diff, Hyperballs, Hyperrings, graphite chassis, real axle ultralight aluminum hubs, adjustable ride height, adjustable castor, adjustable wheelbase, steering stops, steering linkage, special trick steering mount, BBS wheels and Hyperbite tires. A complete line of parts and accessories is available.

Part No. HY 0010. Price: \$449.95.



HYPERDRIVE RC10 PRO KIT

The RC10 Pro Kit consists of motor plate, modified transmission case, rear-motor dust cover, mid-motor dust cover, five motor pulleys (12, 14, 16, 18 and 20), two differential pulleys (60 and 66) and three belts (75, 78 and 81). The kit allows wider motor adjustment that broadens the ratio range.

Part No. HY 1008. Price: \$99.95.

For more information, contact Hyperdrive Racing Systems, Inc., 3210 Howard Nickell Rd., Fayetteville, AK 72703.

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DELTA VILLAIN

(Continued from page 164)

to dive confidently into each hairpin turn; sliding slightly, but there was never even a hint of traction loss (excellent center of gravity and balance). As well as this, the Villain was very fast down the long straightaways, and this allowed me to complete more laps than I've ever done in 4 minutes—with more battery energy to spare.

I give the Villain an A+ for this track report, and I'm extremely impressed with the optional S.S. Industries Hyperdrive System. It's not only extremely quiet, but it also seems to run very efficiently. Subsequent tests with some very hot modifieds also showed good results with the Hyperdrive, so dispelling the myth that the belt can't take the big-horsepower motors.

Partly owing to its three-shock rear suspension, the Villain is reasonably easy to dial-in, and although the shocks are a pain to assemble, they can cure slight handling problems very easily. If the car is pushing too much, you can "jack" the weight to the front end for improved steering. "Tweaking" for different types of tracks is as simple as turning a shock spring collar, instead of working with two

(Continued on page 180)

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TURBO ULTIMA PERFORMANCE PARTS

Robinson Gear Conversion Inside - \$16.99
Robinson Gear Conversion Outside - \$26.59
Trinity Turnbuckle Set - \$29.99
Team Losi B.B. Bell Crank Kit - \$31.49
Trinity Lite Weight King Pins - \$4.79
Robinson Rear Tracking System - \$16.99
Lite Speed Lite Sink - \$27.95
Titanium Tie Rods - \$18.99
Lite Screw Set - \$21.79



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R.C. INOVATIONS

PRESENTS

THE NEUTRALIZER

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DELTA VILLAIN

(Continued from page 174)

screws to make adjustments.

The Villain has good potential, but, just as with any other car, you must spend time with it and learn what works and what doesn't. When you've done that, this car will be brushing fenders with the best of them. It's reasonably durable, and this allows it to take the lumps as well as the rest of them. When you do eventually break a part, however, you could also break into a sweat trying to find the part under the Delta header card, but parts are available if you look. Because Delta manufactures parts for many other on-road cars, many of them are interchangeable with those on the Villain. By consulting knowledgeable people in a hobby shop, you should be able to find the parts you need, even if they don't bear the Delta name.

**Here are the addresses of the companies mentioned in this article:*

Delta Manufacturing, 27 Racecar Ct., Lorimer, IA 50149.

S.S. Industries, 3210 Howard Nickell Rd., Fayetteville, AR 72703.

Futaba Corp. of America, 4 Studebaker, Irvine, CA 92718.

Novak Electronics, Inc., 128-C E. Dyer Rd., Santa Ana, CA 92707.

(Continued on page 182)



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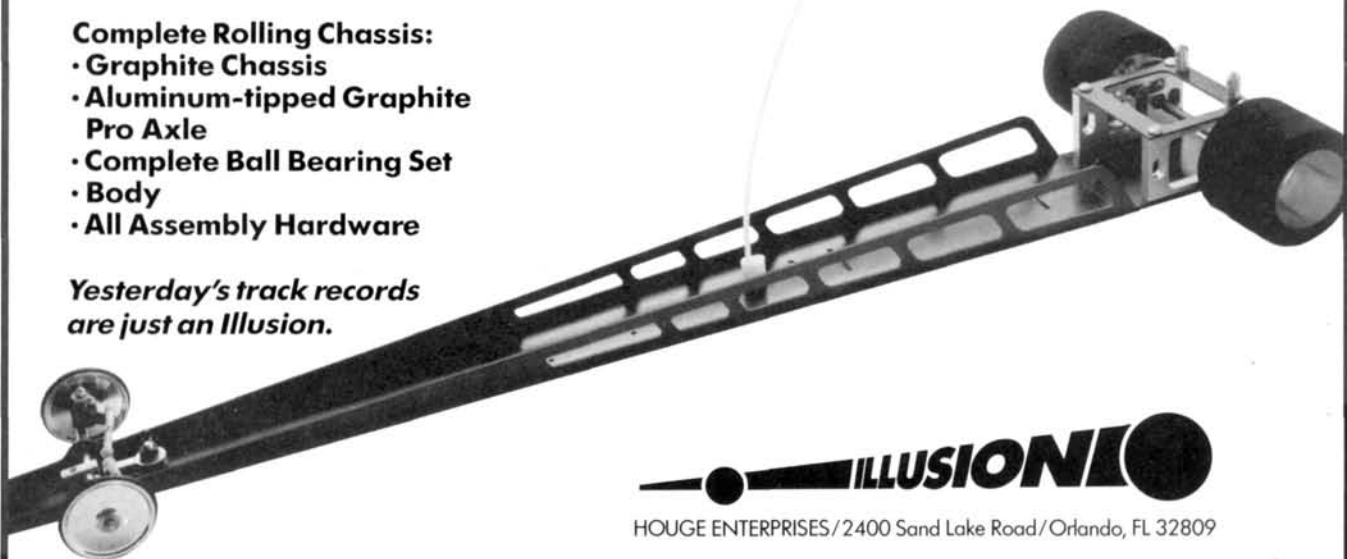
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DELTA VILLAIN

(Continued from page 180)

Twister Motors, 657 E. Arrow Hwy., Suite H, Glendora, CA 91740.

Sanyo Electric, Battery Division, 200 Riser Rd. Little Ferry, NJ 07643.

MRP, 18676 - 142 Ave. NE, Woodinville, WA 98072. Pro-Cut Decals, 415 Poteet Lane, Mechanicsville, VA 23111.

Paragon Racing Products, 8802 Knollwood Dr., Eden Prairie, MN 55344.

Model Craft Mfg., 3455 West 6th St., Los Angeles, CA 90020.

Twinn-K, Inc., P.O. Box 31228, Indianapolis, IN 46231.

DWA BLU 2

(Continued from page 108)

and tires to the hubs.

Now that the chassis is complete, the radio can be installed. I use a Futaba* Magnum PCM 3-channel transmitter and receiver. The Magnum PCM allows a very quick set-up of the radio requirements. If you're serious about racing, this is one radio to consider: It has dual rates, end-point adjustment, ATV (adjustable travel volume), exponential control, reversing, digital trim adjustment with push-button tabs, and many other features.

The DWA servos are made for this car. They provide tons of torque at reasonable transit times with good centering at neutral. With the supplied hardware, mounting the servos was no sweat. Wait until you see the servo-saver! Wow! This baby is *big*, and it's meant to take a beating. At the rear end, there's another one; this one keeps the rear wheels in line and serves as a breakaway point if the rear wheels take any type of impact—quite thoughtful and handy, if you want 4WS. The receiver location is left to the racer, but no real consideration is given to vibration protection.

The custom-made, 5-cell battery uses sub-C Sanyo* cells. The interesting thing

(Continued on page 188)

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DWA BLU 2

(Continued from page 182)

about the battery is that it's suspended in mid air by rubber bands in the front of the car. There's a large opening in the forward

upper chassis plate where two rubber-band anchors are mounted. By using rubber bands to trap the battery, it's suspended in the opening and shielded from shock and vibration.

Three body styles are available for the


Blu 2: a Ferrari Testarossa, a stock car and a Porsche 962 GTP. All are made of ABS-type plastic. I chose the Porsche 962 GTP, which seemed to be the most natural body for road racing. Although slightly out of scale and a little bigger than I'd like, it's still a neat body.

The car is now complete!—no easy feat! Because of the nearly nonexistent instructions, assembly is difficult, at best. I chose to fuel the Blu 2 with unleaded gasoline and added a Blendzall oil mix for lubrication. Testing took place at the best 1/4-scale track west of the Mississippi: the Cajon R/C Raceway in San Diego, CA.

PERFORMANCE: Without being primed, the Blu 2 engine was rather balky to start. Although the carb is equipped with a diaphragm pump, it required a prime to get things moving. A large, paper-element air filter is supplied with the car, and priming the engine simply requires removing the filter and placing your hand over the carb mouth while pulling the engine through. Hook up the plug wire and give the starter a yank.


The engine was easy to tune, and I soon had the Blu 2 going slowly around the track. When I was happy with the trims and steering rates, I treated the tires with

(Continued on page 190)




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DWA BLU 2

(Continued from page 188)

traction compound and took to the high-banked turns of the Cajon R/C Raceway.

On the track, the Blu 2 shows lots of

punch! I had watched big-time racing at this track several times before this outing, and I wasn't too impressed with the speed or punch from the cars, but the Blu 2 was proving to be a real treat. I soon

found myself diving deep and hot into the corners, only blipping the throttle once to set the suspension. I came blasting out of the turns at full throttle. The Blu 2 holds its line, despite displaying an abnormal amount of body roll; it seems as if it's about to spin out or roll over, but it comes out smiling. Well, that was a gas, but this is a road car, not an oval blaster.

The Cajon R/C Raceway also has a 1/8-scale road course inside its huge oval-track section. Admittedly, the track is a little small for something this big, but I decided to check it out anyway. Surprise again! The Blu 2 was even able to negotiate the tight hairpin turns of the road course without much trouble. I didn't press the car hard through the course because the retaining walls were rather close, but I felt very confident that this car would be one super ride on a road course of an appropriate size. Handling was much better than I expected: Although I'm used to fooling around with 1/12- and 1/10-scale road burners, I only had to adjust to the slightly slower reaction time of a 1/4-scale car. The foam tires provided excellent traction, although I suspect that they won't last very long under the weight and stress imposed by

(Continued on page 192)

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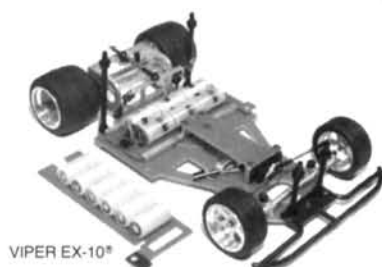
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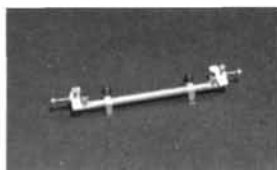
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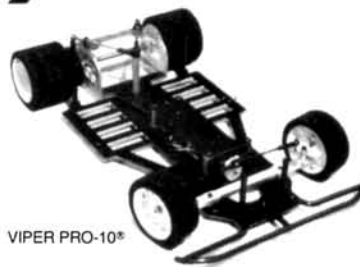
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DWA BLU 2

(Continued from page 190)

this large car.

The only problem I encountered on this outing was the draining of fuel from the tank. When you're having fun and some-

one forgets to bring the fuel can, your day at the track can come to an abrupt halt. The test crew made me feel like an oaf, but I still had an exciting day.

Was it worth the agony of assembly? That depends on how serious you want to

road race. I love the road course, and when 1/4-scale road racing gets moving, I'll be driving the Blu 2. Any challengers?

**Here are the addresses of the companies mentioned in this article:*

Condor Trading/Andes Hobbies, P.O. Box 3077, Laguna Hills, CA 92654.

Futaba, 4 Studebaker, Irvine, CA 92718.

Sanyo Electric, Battery Division, 200 Riser Rd., Little Ferry, NJ 07643.

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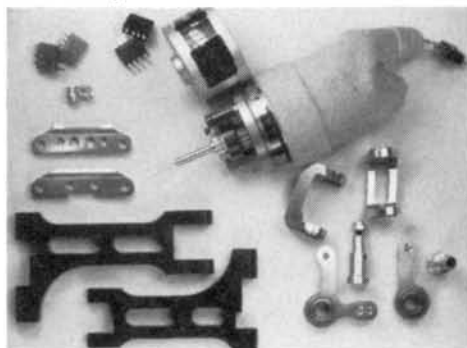
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DIRT DIGEST

(Continued from page 118)

an armature that's been run hard and put away wet. Overnight, things begin to happen, and after a week, the armature will look as though it came from the generator of a '57 Chevy that has been sitting in a corn field for 20 years.

Pull the motor; flush it with alcohol; then flush it with whatever brand of motor cleaner you use. Use a drop of 3-in-1 motor oil on the bushings or bearings. Run the motor at low voltage (about 3V) for five minutes, just as if you were breaking it in. Flush it again with motor cleaner, then run it for five more minutes.

That's a lot of work just for the pleas-

(Continued on page 196)

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DIRT DIGEST

ure of driving through the snow, but the alternative can be disastrous. One young snowmobiler brought me a deliriously hopped-up RC10 with a motor that had been damaged so badly I couldn't turn it with pliers and a vise. Two hours later, it was running again, but even so, the motor was only good for practice.

Chassis al Dente

Even at their soggiest, plastic, carbon, or fiberglass chassis can't be damaged by melting snow, but sometimes this water can lead to damage in other areas. Tamiya seems to love the tub-type chassis. As its name implies, a tub chassis will collect wet stuff at every opportunity. While the tub itself might not be damaged, suspension links that are left sitting in a tub of water will soon turn brown and fall off.

The RC10, which has become my "semi-favorite" 2WD, is a peculiar case. Its chassis is made of anodized material, and it does quite well in the war against rust, but nothing lasts forever. This is especially true if you consider that the RC10 collects moisture where the front suspension pod is mounted to the chassis.

(Continued on page 198)

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DIRT DIGEST

(Continued from page 196)

It's a place that you'd never think of looking because you'd have to disassemble the whole front end. Disassemble it, coat both sides of the metal plate with some switch lubricant or some lithium grease, and you should then be able to get away with more than a few runs before you have to disassemble it again.

Of course, you aren't necessarily safe if you're using a single- or dual-plane chassis. The current trend in bodies is the use of a belly pan to increase aerodynamics (like the Cat, the YZ-10 and the Avante, or any of Dahm's or Parma's after-market body sets). Run your car in the snow, and you're guaranteed that some of those white flakes will find their way inside the body through the suspension cut-outs and the steering arms. Before you know it, water will run under the belly pan and start attacking the chassis plate. You know the rest and how to fix it.

Water Paddles

It's only fair that you should have some fun in the snow if you'll put in so much work when you've finished. The dynamics of snow are slightly different from those of dirt. There are two general types of snow (aside from the mushy and the melting): one is a semi-liquid (the best for snowballs) and the particles have an adhesive property that causes them to act more like wet dirt. As in wet dirt, the typical spiked tires become caked very quickly and lose their effectiveness. In this type of snow, wide-grooved or V-grooved tires work best, because they push the snow out of the treads as they turn. These tires are typically found on monster trucks, but I've seen a few pairs from Pro-Line and DuraTrax that look as though they'll fit the bill.

On powder (the best stuff for skiing), sand tires work best. They're also called paddle tires, and Tamiya actually supplied them with its old Sand Buggy and the original Grasshopper. The horizontal grooves push against sand for the best propulsion (just like a paddle wheel), and they handle powdery snow well, too.

Next Month

A plague of Frogs arrives next month, and you'll learn all about which parts are interchangeable with those of other vehicles and other manufacturers. Have no fear; your Frog will live forever (or, at least, it will *seem* like forever!). If you happen to own an Alien or an Invader, and you're tired of being stuck with those silly 1.6-inch wheels, have I got a surprise for you!

Would you believe that Avante parts will help you out? Well, that's another story.

Until then, keep those cards and letters coming; and if anyone happens to see Bob (last reported to be wandering around San Jose looking for something to polyurethane), could you point him in the direction of the bus station? See ya next month!

TRACK DIRECTORY

In keeping with our constant efforts to help foster the growth of the radio-control car hobby, we've decided to run this track directory intermittently to inform modelers where they can race and exchange ideas. If you'd like your track listed, send us your name, address, phone number and some information about the track to **R/C Car Action Track Directory**, 251 Danbury Road, Wilton, CT 06897. We'll list as many clubs as space allows.

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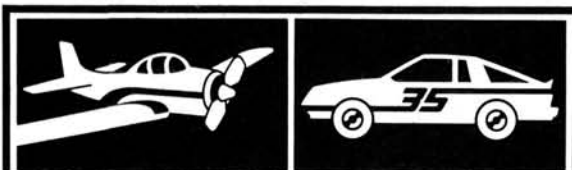
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(Continued on page 200)



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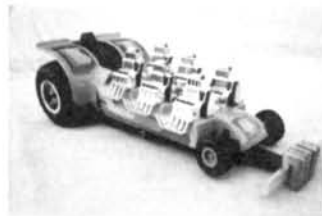


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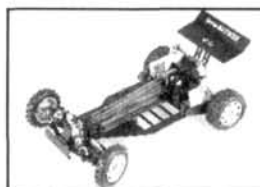


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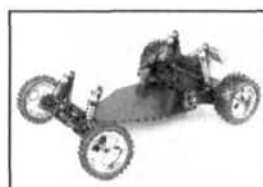


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Ace Hardware	205
Action Videos	15
Advance Engineering & Mfg. Co.	175
Advanced R/C Car Book	195
Aerotrend	134
A.J.'s R/C	134
Alcraft	180
American Modeler	200
America's Hobby Center	194
Andes Hobbies	122-123
A.P.M. Custom Hobby, Inc.	200
Associated Electrics	44-45, 98, 199, C3
Autographics of California	152
B&B Software	22
Badger Air-Brush	84
Basics of R/C Cars	178
Bennett Equipment	208
Boca Bearing Co.	114
BoLINK R/C Cars, Inc.	55, 179
Bondhus	162
BRP	63
Bullet Racing Products	31, 210
Central Model Marketing	201
Cheetah Racing	102
Cobra	158
Competition Battery Sales	160
Competition Electronics Inc.	85
Craig Model	174
Custom Chrome Parts	204
Dahm's Racing Bodies	102
Dana Point Hobbies	196
Dan's RC Stuff	188
Design Ingenuity Enterprises Inc.	204
Doctor J's R/C Warehouse	157
DRG Mfg.	128
Edge Products	198
ERI	154
ESP, Inc.	114
Futaba Corp.	28, 113
Global Hobby Dist.	35, 74-75, 115
Great Northern Hobbies	184-187
Hobbico	209
Hobby Dynamics Distributors	126, 134, 162
Hobby Etc.	192

Hobby House	136
Hobby Shack	165, 166-167
Horizon Hobby Distributors	21, 203
Houge Enterprises	180
Imex Model Co., Inc.	99, 101
Inter-Fab	190
Island Hobbies	152
J.G. Manufacturing	52
J&M Hobbies	161
Koenig Art Emporium	63
K/N R/C. Speedway	192
Kyosho	C2, 8-9, 71, 137
Lazer Lite	33
Litespeed	97
McAlister Racing	177
Miracle Speedway	156
Miniature Auto Specialists	22
MK Model Products	119
Model Craft Manufacturing	153
Modelmakers	208
Model Racing Products	50, 116
Model Rectifier Corporation	11, C4
North Bay R/C	182
Omni Models	80-81
O.S. Engines	155
OWI Incorporated	182
P.B. Sales & Racing	196
Pactra	25
Paragon Racing Products	154
Parma International Inc.	3, 188, 198
Periphex	84
Power Pak	200
Product Design, Inc.	159
PRO-LINE U.S.A.	98, 100
Pro Proven Products	10
Pro Stock Graphics	128
Quarter Flash	190
R.C.C.A. Back Issues	206-207
R.C.C.A. Buyer's Guide	18
R.C.C.A. Monster Truck	43
R.C.C.A. Subscription	67
R.C.C.A. Yearbook	176
R.C. Direct	106-107
R.C. Hobbies	127
R.C. Innovations	174

R/C International	163
RCK	183
R.C. Magic	15
R.C. R.C.	202
R/C U.S.A., Inc.	160
R/C World Hobby Center	208
Racer's Choice R/C	197
RAM	100
Redline Modifieds	158
Riedel Graphics	164
Robbe	133
Robinson Racing Products	78
Ron Charles & Associates	180
Royal Products	23
RPM	164
Sanyo Energy Corporation	125
Scat Racing	129
See's Precision Machine Works	160
Sheldon's Hobbies	86-93
Snowtime Accessories	196
Southside Hobbys	109
S.S. Industries	26-27
Statement of Ownership	208
Stormer Hobbies	152
TMS Products	193
Team Losi	82-83
Tekin Electronics, Inc.	110
The Finest R/C	118
Thorp Manufacturing, Inc.	181
Top Flite	136
Tower Hobbies	138-151
Traxxas Corporation	7, 135
TRC	103
Trinity Products	4, 68-69
Twister Motors	189
Victor Engineering	191
VRP Inc.	156
Walt's Hobby	198
Willing Hobbies	174
World Engines Inc.	14